FOOD MANUFACTURE

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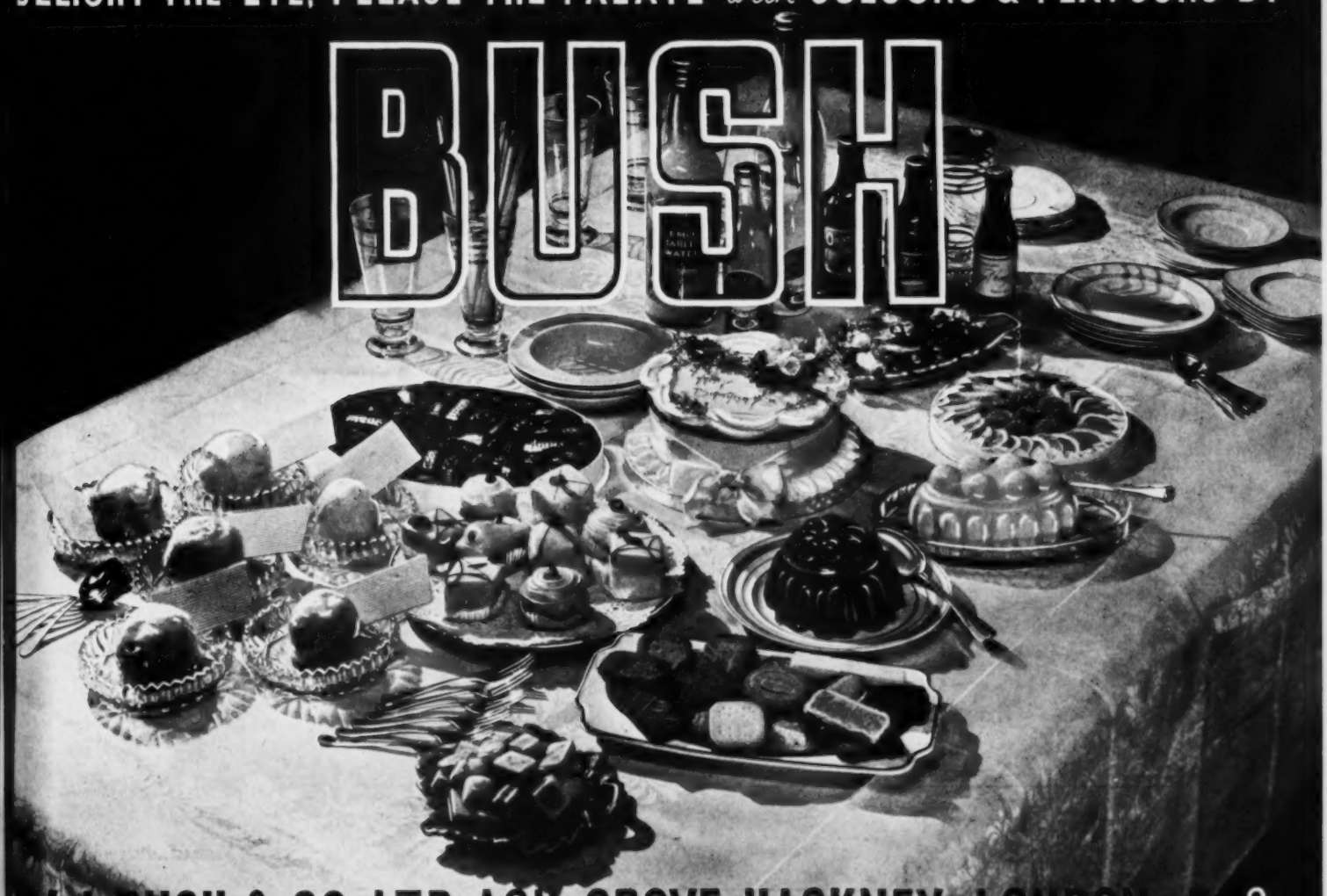

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FOOD MANUFACTURE

Incorporating Canning, Packing and Preserving.

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Colours and Flavour Number

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

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Facing first page of Editorial

FOOD MANUFACTURE

Vol. XIV, No. 6 June, 1939

Food Reserves

IN A quiet sort of way the Food (Defence Plans) Department is slowly but steadily consolidating the position. Much has been said about the storage of wheat, and that is very important, but there is quite a section of the milling trade whose view is that it is equally important to have supplies of flour scattered about the country. Sir Herbert Brown has expressed this view on more than one occasion, and it is surely very sound. If the flour is milled and distributed about the country it is ready to eat and the immediate problem of transport is solved. There seem to be differences of opinion as to how long flour will keep fresh and sound, but we have been informed by a member of a well-known firm of flour millers that he has had a sack of flour in his warehouse for two years for test purposes and it is still fresh. If the flour is milled dry enough it will keep a long time. The Food Minister has asked the bakers to carry extra stocks for a year. Each baker has been asked to state what quantity of flour he is prepared to store above his normal stock, and for every sack so stored the department will pay him 2s. 6d. per annum. The additional flour is to be purchased by the baker from his usual supplier and is the property of the baker. It must be turned over in the ordinary course of business to avoid deterioration. The only difficulty we can see is that the scheme involves the locking up of considerable capital by the baker, as he has to buy the flour. On the other hand, flour is as cheap to-day as it is likely to be, and the 2s. 6d. bonus would offset part of the 6s. 6d. quota chargeable at the present time.

Bribing Agriculture

The latest sop to the farmers is a subsidy of £2 per acre to induce them to cultivate their land. It is a strange country that has to bribe its farmers to till the soil. It is difficult to envisage a Stalin or a Hitler bribing the farmers in their respective countries. We suppose the farmers' pharisaical reply to that would be " Thank Heaven we are not as they ". One can understand the Government giving subsidies to the farmers who have worked hard and produced a good crop, which, unfortunately, owing to market conditions over which they have no control, has to be disposed of at a loss. In such cases of real hardship we agree that the hard-working and well-meaning farmer should receive some tangible assistance, and the Government have spent millions to this end in the case of beet, wheat, barley and meat. That we can understand even if we do not altogether approve. But to pay the farmers £2 an acre to start cultivating their land is fantastic. If it is worthless land why waste the £2 and the effort in cultivating it? If it is good productive land it should already be under cultivation. Surely the Government's subsidy on wheat and barley should be sufficient attraction to persuade the farmers to use the land. This season the farmer who has grown wheat will receive deficiency payments of about 25s. a quarter, and if the yield is about a ton per acre the farmer will get over £5 per acre already. The farmers have had a lot of public sympathy, but there is a danger of overdoing the spoon feeding. Instead of bribing farmers to cultivate their land we suggest some strict penalties for non-cultivation of arable land, and if that doesn't solve the problem let the State take back the land and set gangs of the unemployed tilling it under the supervision of trained overseers.

The Poultry Bill

There have been many efforts to organise the poultry industry in this country, and the question of a Marketing Board for poultry has been one of the most debated topics in farming circles. Strangely enough, the strongest opposition has come from the poultry farmers themselves. Poultry farming to-day is a very different proposition from what it was twenty years ago. Then every farm had an indeterminate number of hens wandering round the barn door. After the war, however, poultry-keep-

ing became the specialised job of a large number of ex-service men, who sought to make a decent living out of their hens. They were faced very quickly with merciless dumping of foreign eggs and found it difficult to make ends meet. To some extent they were aided by the National Mark Scheme, but even that causes delays in distribution. The Poultry Marketing Scheme was turned down because of the complication of registering so many small keepers.

The Poultry Industries Bill is the result of the recommendations of a Technical Committee. Its basis is a Poultry Commission constituted of members all independent of the industry, which may be a very sound scheme, although someone is bound to say sarcastically that the qualification for serving on the Commission is ignorance of the industry concerned. There will be two advisory committees, one relating to stock improvement and the other to marketing.

The measure is extremely complicated and we cannot see its being a success. The Bill does not state at what point action is to be taken. The Minister stated that the Government have no intention that the regulation of imports should be imposed only when the collapse of the market had started. The Bill, however, does not make it clear when assistance is to start. It would be more satisfactory to poultry farmers if the Board of Trade would see that all foreign eggs were stamped as to place of origin and date they were laid, and also that undue dumping of eggs be prevented by heavy duties.

Milk and Scarlet Fever

There has been a recent outbreak of scarlet fever in Denmark, and the description of it by Juel-Henningsen and Ernst is a vivid one. Although the outbreak began in April, 1937, much investigatory work has had to be done before its cause could be ascertained. On April 13, 1937, 20 cases of scarlet fever were notified in Vejle, a community of some 25,000 people. On April 14 the outbreak culminated with the notification of about 40 cases. As most of the patients had been supplied with milk from the same dairy its owner was questioned, and he was able to state which was the milk-cart and which were the farms which provided the milk supplies to that part of the town where the outbreak occurred. Medical inspection of the farms led to the discovery of a hitherto undiagnosed case of scarlet fever in a milkmaid, whose hands were peeling and one of whose ears was discharging pus. She was at once admitted to hospital and all the dairy's milk pasteurised. The outbreak ended as abruptly as it had begun, and undoubtedly the prompt elimination of the milkmaid was responsible for this, because diligent search was made for the disease of the udders among those cows that had supplied the tainted milk, with no result. Every cow was examined twice at an interval of six days, but neither the cows nor the milk could be proved to be infected. The girl alone seems to have been responsible for this outbreak and not the cows, with which she managed to give scarlet fever to 118 people and angina faucium to about 50 others.

Deficiencies in Pre-packed Milk

A little while ago a Cambridge dairyman was summoned for selling pre-packed milk in quantities not a multiple of half a pint. The deficiencies varied from 2 to 4 fluid drachms. Before the prosecution the Chief Inspector had come to the conclusion that the defence would argue that the deficiencies were due to the milk cooling after it had been put into the bottles. In order to meet this contention a series of interesting experiments was carried out to ascertain the apparent expansion of milk in bottles. The results, which were published in the last issue of the *Monthly Review of the Society of Inspectors of Weights and Measures*, were convincing enough to gain a conviction. From one or two experiments over a short range of temperature and by comparison with the expansion of water, it was concluded that the expansion varied according to the proportion of fat. It was found that expansion in a rise in temperature appeared slightly less than the expansion when cooling. The lag was less on the poorer quality milk. Other causes suggested to account for the deficiencies were absorption by the cap and unavoidable drainings left in the bottle when emptied into the standard measure, but actual trials dismissed these possibilities as being negligible.

Gases in Cans

The usual method for getting oxygen out of a can is by drawing it out with a vacuum pump. There are conditions where this method does not suffice, and we are indebted to the American Can Company for a note on this subject. Where the can is so large as to be structurally incapable of maintaining high vacuum without collapsing the outside pressure is compensated for by the introduction of an inert gas, such as nitrogen or carbon

dioxide, the choice of gas depending on the nature of the product. In some cases, carbon dioxide will be absorbed or will give the product an undesirable flavour, and in using inert gases considerable study is necessary to determine which is the most suitable.

Carbon Dioxide Research

It cannot fail to be of considerable satisfaction to British scientists to read an announcement in the official organ of the American Institute of Refrigeration, *Ice and Refrigeration*, of May 1, by J. F. Nickerson, General Secretary of the Institution, in which he says of gas storage of foods that " this method, while new to the Americas, has been applied commercially on a large scale in England for some time ". Continuing, he says that " it should be of great significance to the meat packers, the largest industry in the United States, that Australia and New Zealand shipped to England in 1937 a total of 75,000,000 pounds of chilled beef in cold storage, the product arriving after an average trip of twenty-eight days in better condition, colour and bloom than ever before ".

Mr. Nickerson also states that gas storage in connection with refrigeration, while having been proved commercially feasible and economically sound, it must still pass through careful laboratory inspection and field test to assure safe and dependable commercial usage. To attain the objective of determining the basic principles of gas storage and reducing these principles to practical economical applications in a minimum time, the American Institute of Refrigeration has sponsored a Carbon Dioxide Research Project and appointed the nucleus of a General Committee consisting of outstanding authorities in the various food fields. Each member of the group, representing the scientific laboratories and the refrigeration industry, is contributing his time and advice without remuneration for the purpose of advancing this development as rapidly as possible. Industry and agricultural experimental stations are alike ready for a big scheme of co-operative research.

The whole communication indicates the range and importance of the work to be done. It is a project which will be headed by the industry itself and conducted by itself, with the assistance of tax-supported institutions.

Collectively planned industrial research is, according to Mr. Nickerson, an efficient, modern, democratic approach to problems common to a large group. It will obviate the generally practised method of trial and error by each industry, or perhaps every member of each industry, working alone. Such duplication of effort is expensive and time-consuming.

While viewing the project with great interest and admiration, the thought occurs to us that much of the projected work may duplicate that of our own scientists—work already come to fruition. We are well aware that much of it is published and is available to the workers in other countries, as their work is to us, but this cannot replace a closer personal collaboration. The idea of international scientific collaboration is a fascinating one. Could it be that here is an opportunity for the scientists, who sometimes deplore their helplessness and inarticulateness, to point the way to a wider collaboration of the nations?

Supply of Water to Factories: Use for " Domestic Purposes "

Where water is supplied to premises by a water undertaking, the rate of charge varies according to whether the water is to be used for " domestic purposes " or other purposes. The question of what is a " domestic purpose " may, in certain cases, be somewhat difficult to determine, and there has been more than one leading case on the point. The latest decision is that of Kingston Corporation *v.* Yuille, where it was held that the use of water by a doctor for diluting medicines and washing his instruments was a use for a domestic purpose.

This case follows earlier decisions of the House of Lords. In Colley's Patents, Ltd., *v.* Metropolitan Water Board, decided in the year 1912, in which case water supplied to a factory by the Metropolitan Water Board was used for drinking and washing purposes by the workmen employed there, and also for cleaning urinals and water closets provided for their use, it was held that the use was for domestic purposes, notwithstanding that the premises were a factory and no one resided there.

In a later case, decided in 1914, Metropolitan Water Board *v.* Avery, where water supplied to the licensee of a public house in which meals were also served was used for cooking the food and for washing up the plates and dishes, it was held that the use of the water was for domestic purposes.

What then is the test for determining whether or no the use of the water is for a " domestic purpose "? The fact that the water is supplied to a factory, or to premises used solely for trade or business, is not a deciding factor, nor is the fact that the water is consumed solely in the use of a trade.

The test which was approved by the House of Lords in Avery's use appears to be whether the use of the water is in its nature domestic. In other words, " if the water is used for a purpose which is common to all domestic establishments it is none the less used for domestic purposes because it is auxiliary to a trade, manufacture or business ".

Government Sponsors Food Lectures

Many firms have demonstrators of their foods in large stores, etc., but we have not in England heard of a Government Department, such as the Ministry of Agriculture and Fisheries, sponsoring lectures to popularise the products of farmers or fishermen. Such, however, is done by the Dominion (Canada) Department of Fisheries. Series of fish cookery demonstrations and addresses on fish foods in Ontario centres—the series extending over a number of months—have been given. These have also been given by women lecturers at Prince Edward Island, arranged by the Dominion-Provincial Youth Training Programme.

These lectures consisted mainly of giving instruction to young women as to the value of Canadian fish foods and as to methods for preparing them for the table. At Halifax a course was arranged by the Provincial Government for hotel and restaurant proprietors, managers, and *chefs*.

Another lecturer has been at work in Quebec and Winnipeg, which will also be extended to provincial communities.

Synthetic Resins in Water Treatment

Widespread interest has been aroused both in this country and abroad in the discovery by the Water Pollution Research Board that acids, bases and salts may be removed from solution in water by means of certain synthetic resins, and considerable progress has been made in the development of the resins for industrial purposes by commercial firms who have acquired licences for their manufacture and sale.

In a Report of the Board for the year ended June 30 it is stated that the main applications of the resins up to the present have included the treatment of water to remove all or part of the dissolved salts; such treatment actually taking the place of distillation.

Other applications of the resins are the removal of valuable substances such as metals from industrial effluents and for the removal of objectionable substances in very low concentration in water. These are being developed rapidly.

Evidence from various parts of the world has indicated that the dental defect known as mottled enamel may be caused by the presence of fluorine to the extent of one part per million in drinking water. This defect is common in only one or two small areas in Great Britain, though it is prevalent in a number of areas in other parts of the world. Recent experiments at the Chemical Research Laboratory have shown that, under certain conditions, *m*-phenylenediamine resin takes up fluorine from solutions of sodium fluoride in distilled water. This particular application, however, is rendered unlikely to be of practical importance in connection with natural waters, as the fluorine is not readily removed by the resin when other salts are present in the water.

Budapest Conference

The Sixth International Technical and Chemical Congress of Agricultural Industries is being held this year at Budapest from July 10 to 20. Under the patronage of His Serene Highness Nicholas Horthy, Regent of Hungary, the programme is a full one both scientifically and socially. The scientific work is divided into specialised divisions, with many sub-sections, covering every aspect of agricultural industries. Of particular interest to members of the food industry is Division 2, Subsection 3, which will deal with milling and baking; starch and glucose manufacture; the dairy industries; chocolate and biscuits; the oil and fat industry; fruit and vegetable industries (preserves and fruit juices); tropical industries and substitutes and other industries.

Other topics figuring on the order of the day of the congress are the manufacture of foodstuffs rich in vitamins, with special regard to fruit and vegetable preserves. Also the standardisation of the methods of analysis of agricultural finished products, and a large number of other subjects. We note among the list of *rapporteurs* the names of Mr. Lloyd Hind and Mr. Bishop of Great Britain in connection with papers on the determination of qualities of good malt and its effect on the quality of beer. Other international organisations are convoking assemblies in Budapest and will take part in the congress, among which are the International Milling Association, the International Office of Cocoa and Chocolate, and the International Wine Office. The social programme looks very attractive and includes sight-seeing trips into the country.

Courtesy T. Wall and Sons, Ltd.]

FLAVOURS ANCIENT AND MODERN

G. R. A. Short, Ph.C.

IT IS EVIDENT that man's early craving for variety in food led to numerous experiments with any aromatic plants which might render his simple meat dishes and cereals more palatable. There were doubtless many failures which are not chronicled, but of the successes we have ample records and in some cases the flavouring materials of four thousand years ago are still in use to-day.

Oriental Origins

The spices were undoubtedly the first natural products to be utilised by the oriental nations for their rice and meat dishes by virtue of the fact that they served the dual purpose of flavouring and preserving. Cassia bark, for example, has been known from very early times. It is mentioned in Chinese herbals of 2700 B.C., while references to cloves appear in Chinese writings from 266 to 220 B.C. Theophrastus in the fourth century B.C. refers to two kinds of pepper, and among other early known spices are cardamoms, coriander, ginger, turmeric, nutmeg and mace. Mint, dill and cummin were highly esteemed in New Testament days as seasonings for meat.

Fruits preserved with sugar or honey have been used from the earliest times as sweetmeats, to which confections they imparted some at least of their flavouring properties. Similarly, the use of aromatic herbs and spices for flavouring wines and spirits has been handed down through the centuries by the occupants of the many monasteries which have existed in all parts of the old world. This latter practice has given rise to our natural fruit essence, which in its simplest form is prepared by macerating fruit in alcohol for some weeks, after which the liquid is drawn off and filtered. In the case of fruits of the citrus group, in which most of the flavour resides in the outer portions, the peel only is used for extraction.

Machinery Revolutionises Methods

The modern adaptation of well-known physical laws to machinery design has made possible vast improvements in the extraction and concentration of fruit juices which are a distinct advance upon their predecessors in that the aim is now to preserve the full flavours of the fresh fruits to the maximum degree while retaining a high proportion of the health-giving vitamins, together with the natural mineral salts and sugars. In this connection it has been demonstrated recently that a properly prepared black currant juice contains nearly three times as much vitamin C as lemon and orange juices, while concentrates produced by modern plant and methods are very rich sources of this important dietetic factor.

These concentrated fruit juices prepared either *in vacuo* or by freezing processes are largely employed for flavouring aerated waters and confectionery, but in the latter case it is often necessary, on grounds of economy and stability, to augment their flavouring value by the use of essential oils, various extracts of vegetable origin, and in some cases a blend of fine synthetics. A few years ago the use of essences composed entirely of synthetic materials was widespread, but the skill of the compounder and the public taste have now made it clearly evident that no fruit flavour is complete without its due proportion of natural constituents. The practice at the present time in the compounding of first-class fruit essences is to use a very high proportion of natural con-

centrate with the addition of small quantities of synthetics of the highest purity, to give strength and character to the resulting blend.

In the aerated beverage and cordial trades it is of interest to note that during the last decade the tendency has been to employ increasing quantities of citrus juices containing the full proportion of natural pulp, which is undoubtedly a step in the right direction since it is a well-known fact that in removing this pulp from the juice much of the flavour is lost. This preference for "cell-drinks" has, of course, presented many problems both to syrup manufacturers and engineers, since absolute cleanliness is essential to the preservation in good condition of all such products.

Essential Oils

A further class of flavouring materials of no less importance than fruit products compose the essential oils, which are so numerous and varied in their uses that it would be impossible to do them justice in a short article. However, brief reference will be made to those which are of most universal value. The citrus oils, comprising those of the lemon, orange, lime, mandarin and grapefruit, are perhaps the most important, since they possess what may be termed an extremely fresh character and consequently lend themselves to use either alone or in combination with other flavours.

The Italian citrus oils for long enjoyed an unrestricted market, but during recent years other countries have been producing citrus fruits and their oils in increasingly large quantities. Chiefly must be noted the orange oils of South and West Africa and the extensive lemon, orange and grapefruit production of the United States, notably in California. The methods of extraction of these oils fall into two main classes: expression and distillation. The expressed oils, since they are not subjected to heat treatment, are vastly superior to those prepared by distillation and consequently demand a higher price. Distilled citrus oils, however, serve a useful purpose in the cheaper types of confectionery. There is one possible exception to this generalisation, viz. that of lime oil, which only in the distilled form exhibits that characteristic lime flavour which is so popular in cordials and confectionery.

Citrus Oil Treatment

The essential oils of the citrus group consist for the greater part of terpenes, which have little flavouring value, and the content of oxygenated bodies, upon which the odour and flavour depend, is relatively low. The presence of terpenes renders the oils comparatively insoluble, which fact is a distinct disadvantage in the beverage industry when it is desired to produce a clear aerated water. For use in syrups of the clear type recourse must be had to some form of treatment whereby the flavouring principles of the original oil may be concentrated. This may be accomplished either by extraction with alcohol of suitable strength whereby a soluble essence is obtained or by careful fractionation in high vacuum.

Popular Peppermint

Peppermint oil, which has such a universal appeal, exists in many qualities; English (Mitcham), American, Japanese, French, Italian, Hungarian, Bulgarian, etc., all of which are used in confectionery, cordials and liqueurs. Each type of oil possesses different characteristics, but none of the imported oils has the bouquet of English distilled oil. Japanese oil is the cheapest quality, and many tons are imported annually. American peppermint, owing to its moderate price and good quality, also finds a very extensive use in this country. To obtain the best results these oils are frequently rectified and blended. In addition to the uses mentioned above, peppermint oil is employed in hygienic preparations such as dental pastes and mouth washes.

Chewing Gum Flavour

Spearmint oil, which is closely allied to the foregoing, has the odour of ordinary garden mint, and when blended with peppermint forms the bulk of the flavouring material of chewing-gum.

Clove oil is sometimes used alone in flavouring boiled sweets, but by far the larger proportion is employed in the form of blends with oils of cinnamon, cassia, caraway, dill, aniseed, peppermint, etc., in cachous, lozenges and medicines. There is, however, another virtue in that these oils possess valuable carminative properties, and therefore, in addition to rendering nauseous medicaments more palatable, they also play some part in allaying suffering.

Ginger is very widely used in the preparation of extracts and essences for ginger ales, ginger beers and for baking purposes. The distilled oil of ginger possesses the aroma of the root but is without the characteristic pungent principle and consequently, where this is required, use is often made of the oleoresin or other form of extract. It is interesting to note that, despite the research which has been devoted to the subject over a period of many years, it has been found practically impossible to produce an ordinary essence which will give the natural odour and flavour of ginger beer brewed from the root.

Aniseed oil, which is distilled in large quantities from the Chinese star anise, is used extensively for flavouring confectionery, both alone and as a blend with peppermint, spearmint and liquorice. On the Continent this flavour is greatly appreciated for addition to milk beverages and also in the form of the liqueur "Anisette", for which latter product the isolate anethol is employed.

Essential Oils in Meat Foods

Long before the value and advantages of essential oils were appreciated it was customary to incorporate large quantities of "rubbed" or ground herbs and spices with meat foods. Although these materials are still used, their place has been largely taken by essential oils in sausage meat, meat pastes, soups, etc. Prominent among the oils so used are those of pepper, sage, pimento, cinnamon, celery, thyme, garlic, mustard and nutmeg.

Among the less common oils which find a place in the beverage industry are those, such as hyssop, marjoram, angelica, cascarilla, angostura, basil and calamus, which are used in some of the modern counterparts of the once-famous monastic liqueurs.

The subject of this article is such a wide one that it would be impossible adequately to deal with all the natural materials available for flavouring, but mention must be made here of a few articles which do not fall into either of the classes already dealt with.

The Vanilla Bean

The vanilla bean, for example, is probably one of the most popular of flavouring materials. It has quite an ancient history. It was used by the Aztecs, before the discovery of America, as a flavouring for their chocolate, but was not imported into Europe until the early part of the sixteenth century. Tinctures, prepared by macerating the beans in alcohol, have been the basis of vanilla essences for many years. Vanilla has been the universal flavour of countless tons of chocolate, ice-cream, custard, pudding powders, cakes, etc., and its popularity never seems to diminish.

No Synthetic Counterpart for Saffron

Saffron, consisting of the stigmas of a species of crocus, has been in use for centuries both as a flavouring and colouring material in the well-known Cornish saffron cakes and in barley sugar-sticks. This, incidentally, is one of the flavours which so far has no synthetic counterpart.

Tonquin beans, the chief aromatic constituent of which is coumarin, serve as useful adjuncts to vanilla in caramel and toffee flavours. A tincture or extract of the bean is found indispensable in the flavouring of high-class tobaccos.

The class of flavours known as "bitters" has uses primarily as appetisers, but they may be grouped according to their spheres of usefulness as follows: hops are used almost exclusively in the brewing of beer and herbal beverages, while quinine and quassia impart bitterness to the well-known tonic waters. The more "herby" bitters, of which chiretta, gentian and wormwood are types, are ingredients of cocktail flavours, and cinchona is used in some tonic wines.

Liquorice root is an important flavouring material in the confectionery industry, especially as a constituent of such lines as linseed, liquorice and chlorodyne lozenges and gums. The powdered root is often used in lozenges, but the majority of the liquorice employed in confectionery is in the form of the extract known as "block juice".

Flavouring Tea and Coffee

The flavours associated with some of the national beverages call for some comment in view of the large quantities of tea, coffee and cocoa consumed.

India, Ceylon and China teas are frequently perfumed with floral oils and extracts to give them distinction. Efforts to produce satisfactory essences from tea itself have so far failed, probably on account of the delicacy of the aroma of the cured leaf and also of the unstable nature of the tannins present. Coffee, on the other hand, is used in large quantities for the manufacture of extracts which are employed for beverage purposes as well as flavourings for confectionery. Kola nuts, which belong to this class of caffeine-containing products, have been used in mineral waters for many years, and their use appears to be extending in that direction. Cocoa in the form of powder or as block-chocolate is so widely known as to need no comment since the estimated world consumption figure of 600,000 tons per annum speaks for itself.

Dr. Cruess Sails for U.S.A.

Dr. W. V. Cruess, Professor of Fruit Technology, University of California, left England on May 12 for the U.S.A. Before leaving he told an interesting story about the four new million-dollar-per-year laboratories, called the Regent Laboratories, the building of the first of which is expected to start on June 1. It will be built on a stretch of agricultural land near the University. The purpose of this laboratory is to find an outlet for surplus agricultural products, for which, owing to the self-sufficiency campaign in Germany and Italy in particular, and because of ever-rising trade barriers, the U.S. Federal Government (who are erecting the plants) has to find a home market. This is necessary for the reason that, as Dr. Cruess puts it, "Russia and all Europe have clamped down on us".

The output of the food trade is limited to the capacity of the Yankee stomach. The situation is critical, and something has to be done, so the new laboratories are getting to work to find out how they can utilise the millions of dollars' worth of agricultural surplus for non-edible commodities, such as plastics, rayon and other materials—that is to say, new materials for industry.

Chemical, biochemical and micro-biological work is to be carried out by an expert staff of engineers and chemists. Heading the staff is Mr. T. L. Swenson, formerly attached to the Food Division Bureau connected with Chemistry of Soils. Each laboratory is expected to spend one million dollars per year.

Fish-Bread

Just returned from Norway, Dr. Cruess went to Bergen and saw the Fish Products Research Station at 66, Thormohlinsgate, where they are finding out amazing secrets about food production from fish. There is actually an edible fish-bread made from fish dried at low temperature, and this, according to Dr. Cruess, is a very good product, containing both calcium and phosphorus in an absorbable form, and very suitable for pregnant mothers and young children. The man behind the miracle is Dr. Harold Weeden, who is an Anglo-Norwegian.

Dr. Cruess was also very impressed with the cod liver oil being made in Norway, which tastes like olive oil and is produced from dried cod fish.

During his recent peregrinations Dr. Cruess visited Egypt, and found perfect orange drinks made from fresh fruit, which are ousting the drinks made from synthetics.

At Breda, in Holland, Dr. Cruess went round the Hero Company's works, where are produced jams, jellies and pure carbonated fruit beverages. An interesting example of one of these is a 50 per cent. apple juice carbonated product.

A firm whose name had been associated with sausages for upwards of a century sought a summer line. The answer was ice-cream. In the short space of seventeen years a business was built up which has made its produce a household word. The ultra-modern factory, replete with the most efficient of automatic machinery, is described in this story of

WALL'S ICE-CREAM

IN THE BEGINNING—that is to say, some hundred and fifty years ago—there were sausages. Wall's sausages, in fact. But sausages sold more freely in the winter-time than in the summer, hence it was deemed desirable to find something more suitable for summer trade. The answer to the problem was Wall's ice-cream, and time has proved that the answer was a good one.

It was only seventeen years ago that Wall's started manufacturing ice-cream, but when once the decision had been taken progress was very rapid. A then junior director went over to America and worked for several months in one of the leading ice-cream factories. On the completion of his apprenticeship he purchased the plant necessary to start manufacturing operations and then came back to England to put the knowledge gained into practice.

"Stop Me and Buy One"

Sales were none too good at the commencement. Much experience had to be gained and retailers did not take very readily to the idea. It was not until the decision to sell direct to the public was taken and the now celebrated slogan "Stop Me and Buy One" evolved that the success of the venture was assured.

In 1922 the firm put ten box-tricycles on the road. Rather crude affairs, in which ice and salt was used as a refrigerant. To effect a sale the salesman had to dismount, withdraw the whole outfit from the front door of the tricycle and extract the packet of ice-cream as best he could!

Distribution Depôts

The following year the fleet was increased to sixty and better service facilities introduced, but it was not until 1924 that distribution depôts were opened in London. From this time progress was very rapid. 1925 saw an additional ice-cream factory equipped at Godley in Cheshire to serve the North of England. There are now nearly eight thousand tricycle and cycle salesmen on the road, served by five divisional headquarters and some 150 local distribution depôts.

The illustrations given in this article show how modern and up to date the Acton factory is. To those whose conception of ice-cream manufacture is only a general one, the expensive and highly developed plant that is used in its modern mass production would be amazing.

At the outset it may be stated that Wall's ice-cream is a pure dairy product. No fats other than milk fat are used in its manufacture. Milk products, sugar, flavouring and a very little stabiliser are the only ingredients used.

A trip round the factory starts from the top. All the ingredients as received are unloaded and taken by lift to the top floor of the three-story factory. This is the mixing and pasteurising room, with its white-tiled walls, burnished stainless steel plant and well-drained tiled floors.

Pasteurisers and Viscolisers

The pasteurisers are eight in number and each is capable of handling four hundred gallons of ice-cream mix at a time. They are made entirely of stainless steel. Each has its recording thermometer to ensure that the correct pasteurising temperature and time is given to each batch. When pasteurisation is complete the mix is drawn off through stainless steel pipe-lines and passes to very fine stainless steel gauze strainers. From these the mix passes to a battery of three viscolisers—large homogenising machines, each capable of handling eight hundred gallons of mix per hour. These viscolisers convert the mix into a perfect emulsion—so important to the texture and palatability of the finished ice-cream.

The First Cooling

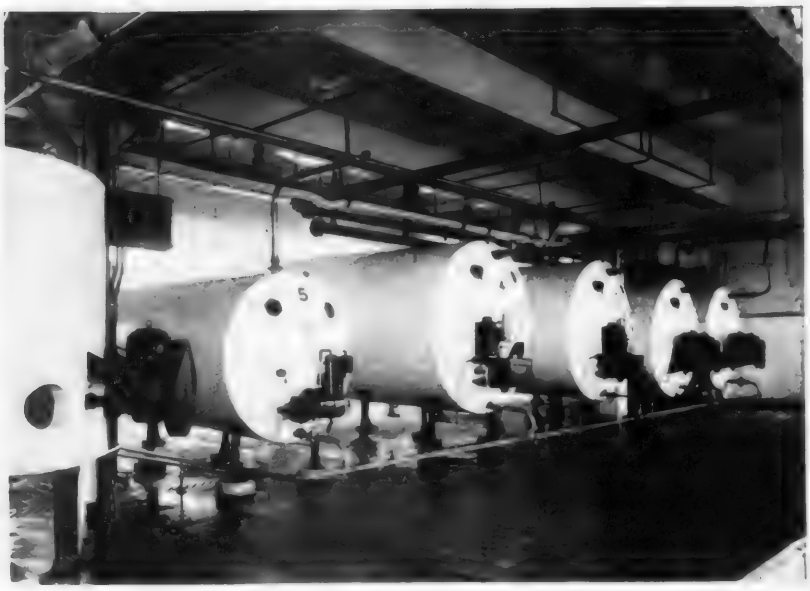
From the viscolisers the still hot mix is passed through pipe-lines to the cooler—a perfect symphony of stainless steel and efficiency. The illustration of the cooler shows it opened, but it is of course closed when being used in order to prevent access of dust.

The hot mix enters the cooler by the pipe-line shown at the top of the illustration and runs into the distribution tray. This tray distributes the mix uniformly over the surface of corrugated cooling plates, the top portions of which are cooled internally by the circulation of cold

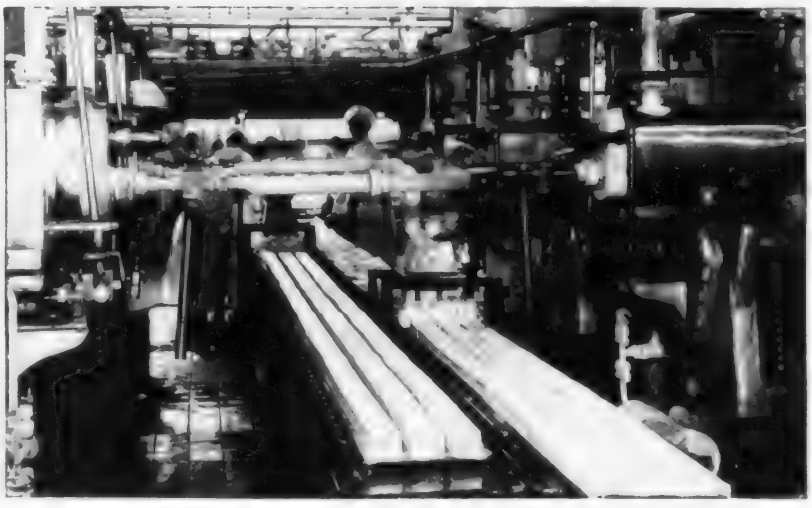
Pasteurisers are eight in number. Each is capable of handling four hundred gallons of ice-cream mix at a time. They are made entirely of stainless steel ; each has its recording thermometer to ensure that the correct pasteurising temperature and time is given to each batch.

"... the mix passes to a battery of three viscolisers, large homogenising machines each capable of handling eight hundred gallons of mix per hour. These viscolisers convert the mix into a perfect emulsion, so important to the texture and palatability of the finished ice-cream."

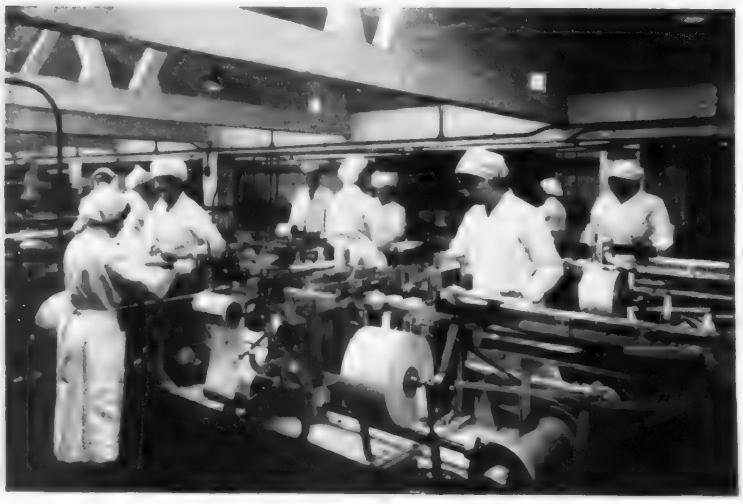
The hot mix is passed through pipe-lines to the cooler, a perfect symphony of stainless steel and efficiency. Here it is shown open, but when being used it is closed. The hot mix enters the cooler by the pipe-line shown at the top of the illustration, and runs into the distribution tray. This tray distributes the mix uniformly over the surface of corrugated cooling plates. This plant is capable of cooling some two thousand gallons of mix per hour from a temperature of about 140° F. to about 35° F.



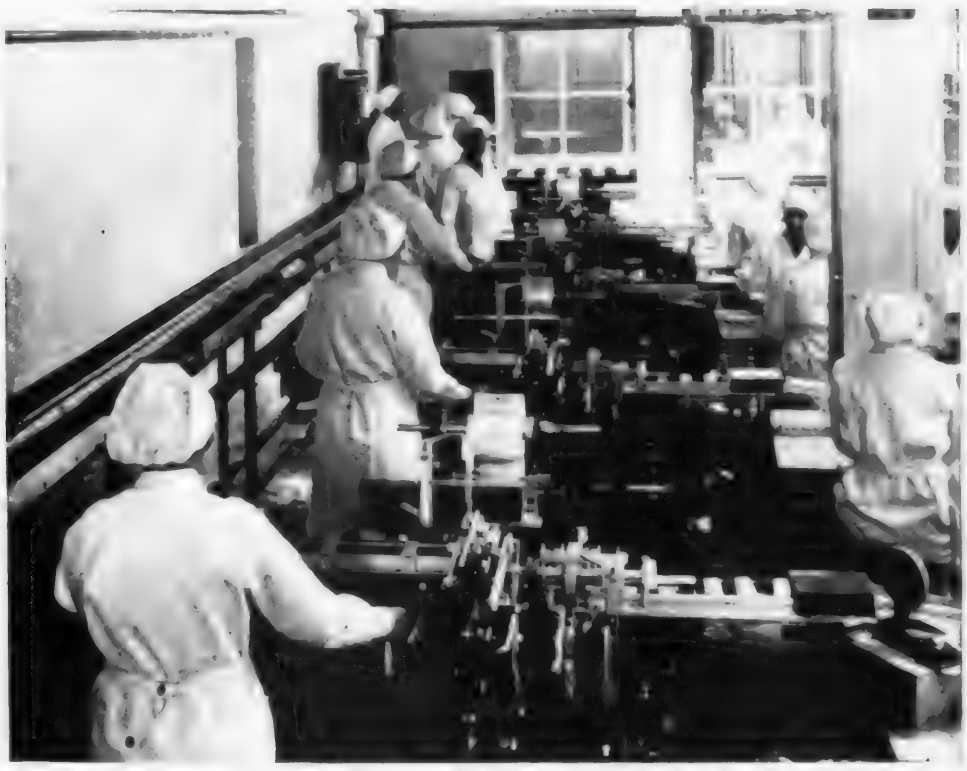
". . . a very imposing battery of insulated glass-lined storage or ageing vats, the largest of which is capable of holding five thousand gallons. Subtle and little understood physical changes take place in these vessels, but which play an important part in the delectability of the frozen product."



. . . " A rather noisy department this, with whirring machinery, conveyors and elevators." This is where the actual freezing takes place, and the illustration shows the semi-plastic ice-cream leaving the freezers in the form of a ribbon.



Here are the very ingenious machines which cut up the bars and wrap the portions in parchment paper, drawn from a reel at the rate of sixty per minute. The machine collects six portions side by side and an operator passes these through a bundling machine, which wraps up the six portions into one packet.



Another automatic machine which wraps " Choc-Bars " in pieces of aluminium foil.

" Snocremes " are similar to " Snofrutes " but contain milk products in addition to sweetened fruit juice. They are frozen in moulds. On the right of the picture are seen the brine tanks in which the freezing operation is done.

Bacteriological and chemical control of the ice-cream is carried out at all stages of the operations. Here is a view of part of the extensive laboratories.

water, and the bottom portions by means of a direct expansion ammonia system. This plant is capable of cooling some two thousand gallons of mix per hour from a temperature of about 140° F. to about 35° F.

For cleaning purposes the "leaves" of the cooler are hinged and can be opened up like the leaves of a book, thus facilitating this very important operation.

The Ageing Process

From the cooler the mix passes by gravity to the floor below, where is installed a very imposing battery of insulated glass-lined storage or ageing vats, the largest of which is each capable of holding five thousand gallons. The mix is held in these ageing vats for a number of hours, during which subtle and little understood physical changes take place which play an important part in the delectability of the frozen product.

The mix now gravitates to the ground floor, where the actual freezing takes place. A rather noisy department this, with whirring machinery, conveyors and elevators.

Freezing is Continuous

The freezers are of the continuous type. That is to say, mix is continually entering the freezer and leaving it in a plastic semi-frozen condition. The old type of freezer was a batch machine, only capable of handling a given quantity at a charge; this type, however, is rapidly becoming extinct.

The semi-plastic ice-cream leaves the freezers in the form of a ribbon, the cross-section of which is the same as the familiar twopenny brickette sold by the tricycle salesman. These ribbons are extruded on to suitable parchment paper covered trays and are sufficiently hard to stand up by themselves. The ribbons are cut off to suitable lengths and the trays placed on trolleys, which are in due course passed into a hardening tunnel, maintained at a very low temperature.

The trolleys travel through the tunnel automatically and in due course are ejected at the other end, with their cargo of ribbons in a hard, frozen condition.

Brickette Making

Next comes the cutting and wrapping of the ribbons into individual brickettes and the wrapping of each portion. These two operations are carried out on very ingenious machines, the bars being cut up and the portions wrapped in parchment paper drawn from a reel at the rate of sixty per minute. The machine collects six portions side by side and an operator passes these to a bundling machine, which wraps up the six portions into one package.

After packaging, the ice-cream is packed into square, metal cans, which are sent to the refrigerated stock rooms and which will ultimately find their way, still in a frozen condition, to a salesman in, say, Plymouth, Brighton or Yarmouth, or in fact almost any part of Great Britain.

Choc-Bars

Apart from the manufacture of ice-cream in the form of small brickettes, there are other products manufactured by the company which call for special methods. "Choc-Bars"—bars of ice-cream coated with chocolate—are a delightful modification of the plain brickette. It might well be thought that the coating of ice-cream with hot chocolate might lead to complications. Nevertheless, this is done, the machine performing the operation being an "enrober". Although enrobers have been used in the confectionery trade for many years, a special one had to be designed for ice-cream work. The ice-cream is cut up into pieces and deposited on to a conveyor belt, which carries them through a bath of molten chocolate. On leaving the bath another belt picks them up and transfers the bars, now coated with chocolate, to wrapping machines, which wrap them in pieces of aluminium foil.

(*Continued on page* 208)

COLOURS FOR CANNED FOODS

Specially Contributed

ALTHOUGH the addition of artificial colour to canned food is by no means practised universally, there are some types of tinned food which have to be coloured in order to be attractive in appearance. This applies mainly to red fruits, such as strawberries, red currants, black currants, and to most green vegetables.

The natural colour of red fruits is due to anthocyanin pigments. These red pigments are very easily reduced by the traces of nascent hydrogen produced by the action of fruit acids on tinplate, the original red colour changes to an unattractive purple shade, and on prolonged reduction the almost colourless leuco base is formed; in other words, the canned product fades. The colouring matters used are coal-tar dyes and are generally acidic in character, due to the presence of sulphonic acid groups. It is a generally accepted fact that such "acid" colours are quite harmless, but that basic dyes, and those containing nitro groups, are toxic and should be avoided when possible.

Actually it is a moot point how far dyes, which have been proved toxic to animals, when given in large amounts, are dangerous to the consumer in the very small quantities used. About one part of dye to eight or ten thousand parts of the foodstuff will impart a brilliant colour.

Colouring Canned Fruit

In the case of red fruit, with the exception of cherries, Ponceau 3R (Colour Index No. 80) and Ponceau 2R, both mono-acid dyes, are largely applicable. They are added to the syrup used in canning strawberries in a strength of 2-3 gm. per gallon, and in rather less quantities for raspberries and cherries. Although red plums are frequently tinted with erythrosine, they also respond well to small quantities of Ponceau 3R. For cherries, erythrosine (a xanthene dye) is used exclusively. White cherries are either blanched in water, to which a fair quantity of dye has been added, or canned in syrup containing about 1 gm. per gallon of the dye. The trouble is that the cherries are apt to bleed, especially in the absence of acid, and in the case of fruit salads are apt to cause unsightly discoloration. The presence of ½ gm. of citric acid in a gallon of the syrup helps to overcome this defect.

Amaranth (Colour Index No. 184) is another dye suitable for colouring fruits, but it has a rather bluish-red shade, which is generally undesirable but is quite suitable for raspberries and blackberries. Gooseberries are not often coloured, although most colour manufacturers list a gooseberry green. Yellow plums are definitely improved by a small addition of Sunset Yellow to the syrup. Mention should be made of canned rhubarb, which is also much improved in appearance by the addition of Ponceau Red. This dye is also suitable for canned beans in tomato sauce, to which it imparts the required brightness.

Vegetable Colours

The other main class of canned goods requiring the addition of colouring matter is that of vegetables. Peas especially are much improved by the addition of colour. At one time the colour of the peas due to chlorophyll was fixed and made to appear brighter by the addition of small quantities of copper salts. This is now forbidden by law. Zinc salts also assist in fixing the colour of the chlorophyll, but also are not permissible. Most manufacturers now list a special dye which is added to brine used in canning the vegetable. In the case of peas the colour is added after cooking, and it has been found that the addition of a little acid sodium phosphate helps to fix the colour. Beans, spinach, and brussels sprouts are also tinted green; 1 to 3 grams of dye to a gallon of covering liquor is the usual quantity. In the case of spinach, very often the vegetable is blanched in a fairly strong dye solution with added brine, and the product will retain a good colour on canning with fresh brine.

Other canned goods which are frequently coloured belong to the class of fish and meat products. Kipper brown is a very important dyestuff for canned smoked fish. Sausages are dyed with Ponceau 2R or Polony Red. The various meat and fish pastes are also coloured by a large variety of dyes, such as Rhodamine and Armenian bole substitute. The last class of goods are coloured, whether used in the fresh state or for canning, and it has not been found that canning affects the colour of fish and meat products.

Thanks to the invention of coal-tar dyes and the production of suitable food colours, preserved and canned foods have a much brighter appearance and are therefore proving more appetising to the consumer.

Food Inspection in Holland

At a recent meeting of the Society of Public Analysts and Other Analytical Chemists, Mr. J. Straub, Chemical Ing., after brief references to some of the analytical work of Dutch chemists, the author, who is Director of the Food Inspection Laboratory for Amsterdam, gave particulars of some analytical methods which have been devised in this laboratory.

An empirical measure of the consistency of butter is made in terms of the force required to cause penetration by a standard "mechanical thumb". Consistency of fats is closely related to the proportion of solid (crystals) to interstitial liquid components, and dilatometric and calorimetric methods of determining this proportion have been devised.

In the calorimetric method the rate of temperature changes in the fat during a constant rate of inflow of heat from a surrounding bath across an air jacket is measured and plotted.

A new method for measuring and optically characterising the "whiteness" of flours depends on amplification of absorption of different parts of the spectrum on repeated reflection. The paper gives also a general account of Food Inspection in Amsterdam.

GRADING MILK BY THE RESAZURIN TEST

While the methylene blue test is widely known for milk grading, the resazurin test is as yet comparatively unknown. Its advantages and disadvantages are discussed in this article by J. G. DAVIS, *Ph.D.*, *M.Sc.*, of The National Institute for Research in Dairying, University of Reading.

A SUPPLY of good-quality milk is of fundamental importance in all branches of dairying. Without this the efforts of the most experienced workers and the advantages of the most costly plant are of little use for either the liquid market or any form of processing.

Factors Governing Quality

Quality in milk has two aspects, each of importance. Carelessly produced milk with a high bacterial count and rich in coliform and other taint-producing organisms will have a short life as liquid milk; converted to butter, cream or cheese it will almost certainly yield a tainted product.[1] In addition to the bacteriological aspect there is the chemical composition of the milk to consider. The most important factor controlling this is mastitis or disease of the udder.[2] Other factors, such as foodstuffs, weather, soil, etc., may exercise an influence on the composition of the milk, but from an economic point of view are probably of minor importance.

Bacterial Content

In attempts to improve the quality of milk, a simple method for estimating the bacterial content is obviously of prime importance. All methods may be classified into three groups—(1) microscopic examination, (2) colony counts on solid media, and (3) methods of measuring the chemical activity of bacteria. Of these the first two are of the greatest use in milk control work but are expensive, involving considerable time and labour. The third group, although much criticised, avoids the economic disadvantages of the direct microscopic count and the plate colony count. All methods for determining the bacterial content of a foodstuff can be criticised on one point or another; the value of any one method depends on the interpretation of the results. The latter cannot, unfortunately, be considered in a straightforward way like the results of a chemical analysis. When we consider that the standard of production, in a bacteriological sense, can only be estimated by a series of tests, and that all bacteriological methods, compared with chemical methods, have a wide range of error, it may be realized that a series of tests having a large inherent error is of more value than one test of much higher accuracy. For this reason the tests in the third group are finding more and more general application.

Chemical Tests

The best-known tests in this group are the methylene blue and resazurin tests. Both depend on the reduction of a dyestuff to a colourless form by the chemical activities of the bacteria in the milk. While the methylene blue test is widely known, however, the resazurin test is as yet comparatively unknown; the latter has certain advantages and disadvantages compared with the former, which should be realised by those who propose to use the method.

Resazurin

This dyestuff is prepared by the action of nitric acid containing nitrous acid on resorcinol. The structural formulæ of resazurin and its reduction products are given below. (Fig. 1.)

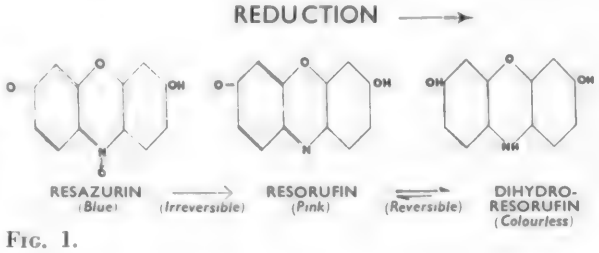


FIG. 1.

In addition to being an oxidation-reduction indicator resazurin is also an indicator of acidity, being blue at *p*H 6·5 and red at *p*H 5·3. Resorufin is pink at *p*H 6·5 and yellow at *p*H 4·8.

If we compare the behaviour of resazurin with that of methylene blue, it may be seen that fundamentally the two substances are very similar. (Fig. 2.)

The most important difference lies in the relative ease with which these two dyes are reduced. Resazurin is much more easily reduced than methylene blue. Thus while methylene blue reduces over the E_h range +0·12 to +0·03 v. in milk, resazurin reduces over the range

+0·18 to +0·09 v.[3] Now fresh milk with dissolved oxygen is usually at an E_H of just over +0·2 v.[4] *It will be evident, therefore, that very weak reducing systems in milk, irrespective of their nature of origin, will affect resazurin much more than methylene blue.* The value of resazurin for milk testing is summed up in this statement, which affords the explanation of the advantages and disadvantages of the method.

Thus, while resazurin reduces more rapidly and so gives a quicker result, it is sensitive to reducing systems other than those responsible for the final reduction of methylene blue in milk.[5, 6] This is usually brought about by coli aerogenes bacteria, staphylococci, and lactic acid streptococci which, in the logarithmic phase of growth, rapidly reduce the E_H of milk from about +0·2 v. to nearly −0·2 v. or lower. This potential is, of course, far below that required to reduce methylene blue. It may be said quite safely that while non-bacterial factors, such as enzymic reducing systems and cells in milk, may influence the rate of reduction of methylene blue in milk, the actual reduction of methylene blue is invariably due to bacterial growth.

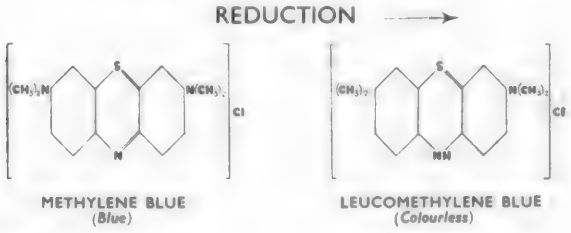


FIG. 2.

Reduction Time

Further, a fair correlation exists between the bacterial content of milk and the methylene blue reduction time. Although only a fraction of the bacteria *initially* present in the milk brings about the final reduction, on an average these are a reasonably constant proportion of the entire flora. In mixed bulk milk other factors may be discredited. In single cow samples, however, and especially if tested freshly, a very different picture is obtained. In such samples, the most important factor appears to be the cells in the milk.[7] High cell counts are frequently, but not always, due to mastitis. In bad cases the cells may be so numerous that the methylene blue is immediately almost entirely reduced. After the first half-hour inversion, however, the colour returns and the final true reduction time may be very long.

Resazurin, on account of its greater ease of reduction, is much more susceptible to such weakly reducing systems. The correlation of resazurin reduction time with bacterial content is therefore inferior to that with methylene blue. As a test for bacterial count, therefore, the resazurin test is inferior to the methylene blue test. The fact that resazurin reduces more rapidly and therefore gives a quicker result would not compensate for the loss of accuracy in the test. The value of resazurin lies in the fact that, being more sensitive to the weak reducing systems of the cells (leucocytes and tissue cells), the test is much more responsive to mastitis than the methylene blue test. Udder disease is, as far as is known, of much greater significance to those processing milk in any way than to those concerned with the liquid milk market. It probably causes most trouble in cheese-making.[8, 9, 10, 11] It has also been shown to be responsible for faults and taints in cream, butter, and condensed milk.

Selection of Test

It will be evident, therefore, that the question as to whether methylene blue or resazurin is the more suitable dye to use for milk testing resolves itself into a discussion of what qualities in milk are of importance to the person making the test. If only bacterial count is of significance, methylene blue should be used. If, however, abnormality as a result of mastitis is of significance, the best single test is probably the resazurin test, which is influenced both by bacteria and cells.

DESCRIPTION OF METHOD

It is essential to procure good quality resazurin. It must be stated with regret that some samples on the market are of no use. The writer has obtained excellent results with Eastman's product.

Preparation of Solution

Dissolve 0·1 g. of resazurin in 200 ml. of glass distilled water (≡0·05 per cent.). Keep this as a stock solution. Make a 1 in 10 dilution as required (*e.g.*, 5 ml. to 50 ml.) and add 1 ml. of this diluted solution to 10 ml. of milk. Keep the stock solution in a refrigerator.

Apparatus and General Precautions

These are as given for the methylene blue test and are fully described.[5] Some additional comments[12] and a simplified method[13] may be found of interest. All the general precautions as given for the methylene blue test apply to the resazurin test. Resazurin is especially sensitive to light.

Method

Fill a graduated test tube up to the mark with the sample, using aseptic precautions. Both the mouth of the sample bottle and that of the test tube should be flamed, using a bunsen flame that is slightly yellow. Then add 1 ml. of the diluted (0·005 per cent.) resazurin solution to the 10 ml. milk and insert the sterile bung. Invert and revert twice, and finally place the tube in the bath at 37° C. Avoid direct sunlight on the sample at any time. The tubes in the bath should, of course, be shielded from light.

Recording Results

As resazurin on reduction passes through a pink form to a colourless form, a wide range of colours may be observed. Normally the colour changes from blue through slightly mauve, mauve, pink-mauve, mauve-pink, and pink to colourless. It is thus possible to

record the results in two ways—(1) by observing the colour at the end of a certain period, usually an hour, and (2) by observing the time required for reduction to an arbitrarily defined end-point. Although the final colourless form is the most definite of all the stages, the pink stage, which occurs earlier, is sufficiently distinctive to be used for this purpose. According to Johns,[14] about three-quarters of the time required to reduce methylene blue is sufficient to reduce resazurin to the pink form. This worker holds that by recording the resazurin results in this way, instead of observing the colour changes after one hour, a more accurate estimate of the bacterial quality is obtained. When it is considered that the earlier the stage of reduction of resazurin, the more important the rôle of non-bacterial reducing systems, and *vice versa*, it will be seen that this assertion of Johns is theoretically justifiable. He also points out that two-hourly inversion of the methylene blue tubes gives much the same result as half-hourly inversion.[14] If this is generally true, one of the chief objections to the methylene blue test largely vanishes, if all that is required is the classification of the milks into bad, moderate, and good (reduction after two, four, and six hours).

Preparation of Standards

Bearing in mind, however, the fact that the value of resazurin lies in its greater sensitivity to factors associated with abnormal milk (in the pathological sense), that this sensitivity is most evident in the earlier reduction stages, and that for manufacturing purposes pathological abnormalities may be equally or more important than high bacterial counts, it may be seen that there is much to be said for the first-mentioned method of recording—viz., observing the colour after one hour. It has, at any rate, the important advantage that only one reading is required, and that the whole test is completed in one hour. The actual recording is, however, technically more difficult than noting the time required to reach the pink stage. It is essential to use a set of standards, and no generally adopted standard is yet available. The best available method is to prepare one's own standards after a few trial experiments by painting on cardboard. It is sufficient to have the seven colours already mentioned earlier in this article. No difficulty should be found in doing this, and, at any rate in the writer's experience, resazurin is far less influenced by pigments in the milk than methylene blue.

A further advantage of recording colours after one hour is that the use of a sliding scale to compensate for atmospheric conditions is possible. All those who have worked with the methylene blue test are familiar with the great effect of temperature on the results. Thus, a sudden cold night may result in a doubling of the reduction time when samples are exposed to atmospheric conditions. Using the resazurin one-hour test it is possible to take, say, a reading of a minimum thermometer outside and to adjust the scale accordingly either by alteration of the colour-quality equivalents or by increasing or decreasing the time of observation. The latter is probably the safer method.

As a working basis the following may be suggested (colours after one hour):

Scale No.	*Colour.*	*Quality.*
1	Blue	Excellent
2	Slightly mauve	Very good
3	Mauve	Good
4	Pink-mauve	Fair
5	Mauve-pink	Poor
6	Pink	Bad
7	Colourless	Bad

It may be emphasised that these assessments include *both bacterial quality and freedom from abnormality in a pathological sense.*

Interpretation of Results

One must be careful, therefore, not to accuse suppliers of faulty methods of production on the basis of the results of the resazurin test. Poor results may be due to a considerable infection with chronic sub-clinical streptococcal mastitis that is quite unrealised by the farmer.[2] The resazurin test should therefore be regarded as a simple test for weeding out unsatisfactory supplies in a broad sense of the term.

Three Tests Necessary

Equally fallacious is the conception that the result of a single test is a criterion of the quality of a supply. At least three tests should be made before action is taken. Those supplies giving two or more bad results out of three (Nos. 5 to 7 in the scale) should be investigated. The first step is to determine the cause of the failure. Probably the best test to link up with the resazurin test is the direct microscopic test. Immediately after the one-hour recordings a smear should be made of the faulty milks and this stained with polychrome or Loeffler's methylene blue. Large numbers of bacteria indicate careless production; the presence of many leucocytes, especially if accompanied by long chain streptococci, indicates mastitis. Often both will be found. Armed with this information the farm inspector may take appropriate action. Further information and results obtained with resazurin will be found in references [15, 16, 17, and 18].

Other Reducing Factors

Finally, reference may be made to the question of the effect of factors other than bacteria on the results of dye reduction tests in general. Many workers have observed, for instance, that reduction times fall suddenly when cows go out to grass in the spring. Besides the question of feed there are such factors as breed, percentage of fat, and season of the year. It is highly desirable that the significance of these factors should be investigated, as far as is possible, by carefully controlled experiments in a number of centres throughout the country.

(*Continued on page* 207)

THE PIP-COUNT OF SOFT JAMS

G. MALCOLM DYSON, Ph.D., F.I.C.

CONSIDERABLE variation exists between the jams made by various recipes, and whilst complete standardisation is not by any means to be desired in food products of this character, it has been a matter of considerable interest to compare certain of the properties of jams prepared from various types of raspberries and strawberries.

During the last fifteen years the author has kept an account of the "pip-count" of some hundreds of samples of soft fruit jams and has, during the last year, made an examination of a set of twelve special experimental boilings. It was thought that the results of these might be of interest to food chemists, and they are, therefore, set out in the following paragraphs.

The Strawberry

The wild strawberry of England (*Fragaria vesca*) is not the parent stock from which the present-day plant is descended; modern berries are descended from various crosses from the *Fragaria chiloensis, Fragaria Virginiana* and an earlier French importation, the Nautbois berry (*Fragaria Elatior*). The exact parentage of the present horticultural varieties is almost impossible to trace. The "pips", or true fruits of the strawberry, remain partially embedded in the developed floral axis, which constitutes the "flesh" of the berry.

It was thought, at one time, that the "pip-count" of a berry jam might yield interesting data concerning the adulteration of jams, and it was with this idea in mind that the author commenced determining the "pip-count" of a considerable number of jams examined from factories in the North Midlands. The summaries of these samples in shown in the following table:

TABLE I.

Strawberry.			Raspberry.		
Pip-count (per 100 gm.).	*No. of Samples.*	*No. Known to be Adulterated.*	*Pip-count (per 100 gm.).*	*No. of Samples.*	*No. Known to be Adulterated.*
0-100	5	4*	0-200	17	13
100-200	11	7*	200-400	42	2
200-300	38	10	400-700	104	—
300-400	44	3	700-1,000	17	
400-600	66		Above 1,000	5	
600-800	14				
Over 800	2				

* *Of these, three were found to contain gooseberry pips.*

Before these results could be interpreted, it was necessary to know the relation of the count to the size and quality of the berry. Wild strawberries were shown to have an average weight of 0·5 gm.; cultivated varieties found in commerce varied from 3 to 10 gm.

Standard Boilings

Six selected types of strawberry were taken and a suitable number of berries was weighed after removal of stalks, leaves, etc. (usually about 600 gm.); to these was added twice their weight of crushed sugar and the mixture thoroughly mixed so as to break up all fruit. This departure from the industrial practice was to facilitate accurate sampling at a later stage in the examination. The mix was brought to a swift-rolling boil in a steam-heated experimental pan. Boiling was maintained for 300 seconds, after which 30 gm. of pectin were added and the batch cooled and bottled after weighing. The results are given in Table II below:

TABLE II.

No. of Sample.	*No. of Berries Used.*	*Weight of Fruit.*	*Weight of Sugar.*	*Weight of Pectin.*	*Weight of Jam.*	*Per Cent T.S.M.*	*Pips (100 gm.).*	*Pip-count Berry No.*
1	60	660	990	32	1650	67·0	360	6·0
2	60	640	960	32	1510	67·5	380	6·3
3	80	660	990	32	1650	67·0	520	6·5
4	100	680	1020	32	1710	66·8	610	6·1
5	150	680	1020	32	1700	67·2	880	5·9
6	200	660	990	32	1650	67·0	1100	5·8

The most significant result was that the smaller the berry the higher the count and better the colour and flavour of the jam. While the "pip-count" varied between wide limits, the figure $\frac{Count}{Berry\ No.}$ is fairly constant. Whilst this figure is of little value for determining the actual adulteration, it is of some interest in ascertaining the grade of fruit which has been used.

Application of Pip-Count

It is quite clear that assuming the sample of jam has been made from the usual and proper ingredients, a calculation of this sort enables us to determine the average size of the fruit and to form some estimate of its quality.

It will be noted that data is also given for jam prepared from raspberries, which can also be evaluated in the same way. In the case of this fruit, there is no doubt that the quality of the preserve decreases as the size of the fruit increases and that, within reasonable limits, the smaller fruit is to be preferred for preserving purposes.

TIME STUDY IN THE FOOD FACTORY

Planning factory work means knowing the capacity of each employee, the best means of securing from each a full measure of efficiency and to put the right number of people on the work. Time study is one aspect of planning and is here discussed by

GEORGE S. ROLFE

INDUSTRY IN this country, during the past ten years, has witnessed a very marked increase in the number of manufacturing organisations where time study methods have been applied. At the present time few factories exist, employing a hundred or more operatives, where the time factor in production has not been studied and stabilised.

There are several distinct causes for this increase in the application of time study methods, and these may be summarised as under:

(1) The interchange in detail of ideas on production control between British and American industrialists, the latter having applied time study scientifically in their organisations for many years.

(2) The general industrial trend towards mass production and standardisation, with the consequent need for the application of fundamental operation times or costs.

(3) The desirability of all operatives being paid on an incentive basis—*i.e.*, a basis by means of which the individual will be rewarded in proportion to the amount of effort put forth.

(4) The increase of internal and overseas competition in practically all industries, thus rendering essential the maintenance of low labour costs.

During recent years many excellent books have been written outlining the varied applications of the stop-watch in industry, and there is no doubt but that at the present time the whole subject is receiving the attention of the production executive to a greater degree than ever before, and as a result the position of efficiency engineer in a manufactory is now recognised as being equal to that of chief engineer or chief chemist.

Before discussing the science of time study as applying in particular to the food manufacturing industry, it should be pointed out that a distinct danger exists if the intricacies and difficulties of determining reasonable piece rates are underrated. It is a comparatively simple task to read and operate a stop-watch, but it should be remembered that the fixing of a rate can only be done after an analytical study of every phase of the job or operation under review, and such a study can only be carried out by a person qualified by experience to do so; that is, someone capable of deciding whether every movement studied is an essential one.

The Function of Time Study

The time study function can be described as the detailed study of every movement or section of the job or process to ensure that each operation is carried out in the most efficient manner; the determination by actual study of the amount of time required to complete the job; based on the study, the fixing of a rate per piece which will include an incentive allowance for the operator; and, finally, periodical examinations of the earnings of the operative and the job on which he or she is engaged in order to ensure (*a*) that in the light of further experience it is not possible to eliminate or alter some of the elemental phases of the job, and (*b*) that the operatives concerned are content with the rate fixed and their subsequent earnings therefrom.

It is suggested that the relative values of the various factors enumerated above could be tabulated as under:

Preliminary study of each element of job ..	70
Determination of time required	10
Fixing of the rate	5
Subsequent re-examination of job	15

The department in a modern food manufacturing organisation devoted to time study will consist of experienced time analysts working under the supervision of an efficiency engineer, and this section would come under the direct control of the works manager. Also, of course, it would be closely associated with wage and estimating offices.

An excellent rule is operative in many factories that no productive work can be paid for on a time (hourly) basis unless it has the sanction of the works manager. (The fact is generally accepted in industry to-day that when the operatives are paid on a piece basis, as compared with an hourly basis, the output increases by about 15 per cent. Thus there is a considerable saving obtained in reduced overhead cost per product.) Under such an arrangement the time study section will automatically receive applications for piece rates for new jobs.

The Analyst's Work

The analyst delegated to a particular job will first of all spend some time studying the various factors associated with the performance of that job or process, and these factors are:

1. Lighting, ventilation, heating.
2. Location of machinery and tools.
3. Efficiency of machinery and tools to be used.
4. Efficiency of service supplying materials, etc., for the process.
5. Type of labour.

It is frequently found that output efficiency can be favourably affected if a lighting point is adjusted, or the position of a machine altered, or some similar change.

When the analyst has satisfied himself that the operating conditions are reasonably efficient, he then proceeds to "break down" into as many elementals as possible the numerous actions or operations which go to make up the complete job or process. Each elemental is given careful consideration to make sure that it cannot be eliminated or simplified in some direction. A stop-watch is then used to take readings of each elemental, and when an average time has been arrived at for each the total time for the complete process is arrived at by addition. To this net time figure are now added the various allowances for fatigue, necessary pauses, etc., and, finally, an incentive allowance is added on to the total figure, this usually being 25 per cent. This total figure represents the fixed and recognised rate for the job or process so studied, and remains operative until further notice.

Naturally in such a varied trade as the food manufacturing industry it is difficult to quote an example which would be of practical interest to all readers of this journal, and the author has therefore prepared a specimen time study sheet (Fig. 1) showing a time study report in respect of sardine canning. No figures are given, but the general layout of the form will give an indication of the manner in which a "time study" is made in the food industry.

Fig. 2 shows, graphically, how by time-studying in a food packing factory (conveyor belt system), the hourly output flow can gradually be increased in sympathy with an hourly increase in the conveyor belt speed.

SARDINE CANNING

TIME STUDY SHEET.

DATE.....

JOB..... OPERATION.....

OPERATIVE STUDIED.....

ELEMENTAL.	1st Reading.	2nd Reading.	3rd Reading.	Average Reading.
	(Seconds.)	(Seconds.)	(Seconds.)	(Seconds.)
Sort fish				
Grade fish ...				
Behead fish ...				
Clean fish ...				
Inspect fish ...				
Raw pack ...				
Place in cooker ...				
Inspect				
Seal tin				
Wash tin ...				
Final cook ...				
Clean tin ...				
Label				
Count				
Pack				
TOTAL				
PERSONAL ALLOWANCE PER CENT.				
INCENTIVE ALLOWANCE PER CENT.				
PIECE RATE PER				

STUDY PREPARED BY.....

FIG. 1.

Time Study as an Efficiency Factor

By means of actual study, the determination of the time necessary for any specific operation or job to be completed provides a means of gauging accurately the efficiency of an operative or a machine. If, therefore, it is assumed that the "studied" time for a job represents 100 per cent. efficiency, it becomes possible to measure the efficiency of actual performance in production with the aid of the following formula:

$$\frac{\textit{Actual time taken}}{\textit{Standard or studied time}} \times \frac{100}{1} = \textit{Efficiency}.$$

The frequent application of this formula will give a reliable indication of the degree of efficiency of any section or operative.

An outstanding advantage of the application of time study in manufacturing production is to be found in the fact that it creates a standard by means of which effort can be measured. It also creates and maintains a consistent output-level, thus assisting production planning and standardising very closely the labour costs of production. A careful study of the times for an operation or job will make it possible to ascertain in a reliable manner the efficiency of the process. By this means, also, the foreman is enabled to compare the relative efficiencies of different types of labour in his employ. It should be remembered, too, that once a time study rate has been fixed and established in a factory, that rate becomes a definite proof that the output rate as specified is not only possible but actually has been attained.

Two Dangers

Two distinct dangers are always found to exist in organisations where any form of time study is employed. The first of these can be described as "the employer's temptation to reduce certain rates when he finds that the operatives are earning more than was anticipated or when it is found that the rate established is really too generous". This represents a really serious factor in the relationship between employer and employee. Once the employer succumbs to this temptation every particle of confidence between the two sections is destroyed.

One of the main advantages of time study is the knowledge, on the part of the employee, that he or she can earn as much as is possible. If rates are reduced, the incentive brought about by time study is cancelled. A golden rule should be enforced in every organisation that rates once set shall not be reduced under any circumstances until such time as there is a definite change in the process itself. When this happens the existing rate should be withdrawn, cancelled and the job restudied.

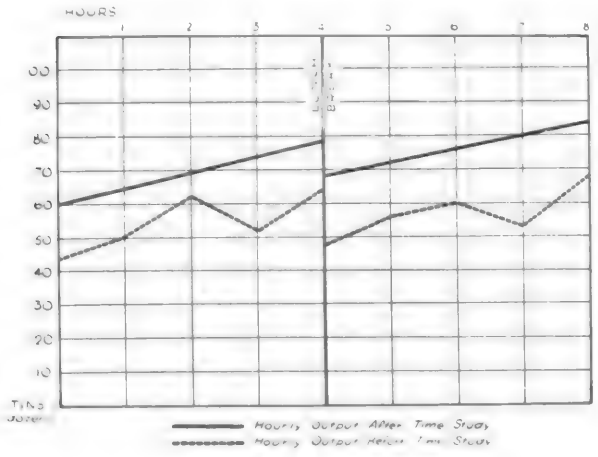


FIG. 2.

Experience Needed

The second danger in this connection is usually found in the smaller type of organisation where the time study of the factory is put in the hands of inexperienced persons, with the inevitable result that the rates established are not accurate. Not infrequently, under such conditions, the employer pays rates which are definitely too high, or, conversely, the operatives work to rates which just as definitely are too low. It will be appreciated that in both cases serious losses will result.

Time study calls for a very high degree of actual production experience, coupled with the ability to understand labour. The actual procedure of determining the output rate is comparatively simple, but the preliminary processes of studying the elements of the job and of ensuring that the operative to be studied is working at a reasonable degree of efficiency are factors which call for experience and natural aptitude. An efficient and experienced time study man should prove an asset to any organisation and his cost should be amply repaid. At the same time, his influence should be felt throughout the factory. The employer should regard him as a critical factor in the company, to ensure that efficiency is maintained at a reasonably high level, whilst in time the operatives will come to regard him as someone who can considerably ease their burdens in many different ways.

When introducing time study into a factory one of the main necessities is that of educating, not only the factory supervisory staff, but all the operatives also, in the functions and advantages of time study. Most operatives are, naturally, suspicious of new systems, more particularly so those which may have an effect on their weekly earnings, and a detailed and full description of the principle of the stop-watch and an illustration of the method of calculating payment rates should do much to increase the confidence betwen employer and employee, at the same time creating a feeling of enthusiasm and desire for co-operation between these two sections.

Conclusions

The main advantages of time study, as far as the factory or production executive is concerned, can be suggested as follows:

(1) The standardisation of cost and rate of output.

(2) The elimination of production delays.

(3) The automatic discovery of the inefficient worker.

(4) The automatic revealing of any "bottle-neck" in production.

(5) The creation of an incentive for the operative to work to the best of his or her ability.

(6) The reduced necessity for production supervision, so enabling a greater degree of attention to be given to quality.

There are other advantages to be derived from the introduction into a food manufactory of an effective time study system. The factors outlined above are of major importance, and the attainment of the full benefit in any of the above directions should be sufficient reason to justify the introduction of time study into the organisation.

Long Ashton Research Station

THE Open Field Day of the Research Station, popularly known as Cider Tasting Day, was held at Long Ashton on Thursday, May 4. From 11 a.m. to 4 p.m. the buildings and grounds were crowded with large numbers of cider makers, fruit growers and farmers who had come to sample the ciders, to see the fruit plantations and to obtain from the staff of the Station the latest information about the research work in progress. Incidentally it was, as usual, a very pleasant social occasion which provided an opportunity for old friends and acquaintances to meet. The visitors included many from all the neighbouring counties and a few from more distant parts.

The Cider Competitions organised by the Station for a number of years have been discontinued, having now served the purposes for which they were introduced. This time, therefore, for the first time for many years there was no distribution of prizes and no speech-making, but in the place of these a part of the afternoon was occupied by a meeting of the members of the National Fruit and Cider Institute.

Apart from the above meeting there was plenty to occupy the time of visitors, as there were special features of interest to be seen in the cider house, the laboratories and the plantations.

Experts meet at the

ROYAL SANITARY INSTITUTE

to discuss

FOOD & DRUGS ACT (1938)

AMONG the recent activities of the learned societies dealing with food was the Sessional Meeting of the Royal Sanitary Institute on April 25.

The meeting was concerned with a discussion on the Food and Drugs Act, 1938, and was opened by a paper by Charles F. White, M.D., D.P.H., Medical Officer of Health, City of London.

Dr. White called attention to the fact that the Drafting Committee had succeeded in consolidating into one single piece of legislation of only 103 sections the various provisions of some twenty-nine Acts, dating from the eighteenth century, and that whatever criticisms might be made, the Committee was to be congratulated on a very great achievement.

There were ample opportunities for new legislation, which appeared to be presented by the new Act. These are to be found in the power given to the Minister of Health and the Minister of Agriculture and Fisheries to make regulations and to local authorities to make byelaws. All the powers to make regulations are permissive and not obligatory, and the same applies to byelaws, with the exception of those for the management of public slaughter-houses.

Powers of Minister of Health

The Minister of Health may make regulations for:

(1) The prevention of danger to health from the importation, transport, storage, exposure for sale and delivery of food of various kinds;

(2) requiring wrappers or containers enclosing food of various kinds to be labelled or marked in accordance with the regulations;

(3) prohibiting or restricting the addition of any substance to, and regulating generally the composition of, any food;

(4) the control of milk and dairies and the prescribing of special designations for milk;

(5) controlling the composition of bread and the addition of substances to flour, and the prevention of danger to health from the importation, preparation, transport, storage, exposure for sale and delivery of bread and flour;

(6) prescribing the qualifications of a public analyst.

The Minister of Agriculture and Fisheries may make regulations as to the presumptive evidence of adulteration of milk.

Powers of Local Authorities

Byelaws may be made by local authorities:

(1) With respect to the handling, wrapping and delivery, and the sale or exposure for sale in the open air of food for human consumption;

(2) for the control of markets;

(3) for the management of slaughter-houses and knackers' yards; and byelaws must be made for:

(4) the management of public slaughter-houses.

The scope of these byelaws which may be made by local authorities is not so wide, and covers only "securing the observance of sanitary and cleanly conditions and practices in conection with the handling, wrapping and delivery of food". This is less than the scope given under Section 183 of the Public Health (London) Act, 1936, by which byelaws may be made for promoting sanitary and cleanly conditions in the manufacture, preparation, storage, transport, or exposure for sale of food. Byelaws have already been made under this section for the County of London.

The speaker did not consider that it would suffice for the Minister of Health to leave local authorities to control by byelaws the cleanliness of foodstuffs, and looked forward to regulations on the lines of the Public Health Meat Regulations, 1924, being applied to foods generally. He admitted that it would not be easy to draw up such regulations covering all foodstuffs, including vegetables, at all stages of handling, and transport from the source of production to the consumer, but Dr. White suggested that the London County Council byelaws would form an excellent basis for regulations.

Food Advertisements

Referring to Section 6 (2), which makes it an offence to publish, or to be party to the publication of an advertisement which falsely describes any food or drug, or is otherwise calculated to mislead as to its nature, substance or quality, Dr. White wondered whether exaggerated or unjustified claims in advertisement or on

labels as to the nutritive value of a proprietary food or the therapeutic value of a patent medicine would be considered under this section as a false description or calculated to mislead as to the nature, substance or quality of the food or drug. He was afraid that it would not; yet it did seem to him very desirable that measures should be taken to prevent the public from being exploited in this way. He feared that unless in the advertisements or labels of proprietary foods and patent medicines some misleading statement is made as to the composition of the food or drug, no offence under the Act would have been committed, and that they would have to wait in the hope that some day there will be legislation prohibiting the sale of proprietary foods or patent medicines which, either in advertisements or labels, claimed nutritive or therapeutic properties which they did not possess. Such control cannot be exercised under the Food and Drugs Act.

Dr. White reminded his hearers that though a case for the extension of standards or definitions of all articles of food had not been made out, they were satisfied that in some cases standards or declarations of composition or definitions of some kind were necessary for the protection of the consumer.

Are Standards Advisable?

Those opposed to standards aver that there is always a danger of minimum standards becoming maximum standards; that if the standards are moderate they may be actually below those of some manufacturers; that if they are high, food which is below the standard yet otherwise quite good might be driven off the market; and, finally, that minimum prices might be raised. The speaker submitted that the manufacturer of high-quality products will maintain their quality, and that he might, with perfect fairness to the public and advantage to himself, apply that much over-worked prefix "super" to his goods. The goods that are below such moderate standards as are likely to be fixed deserve to be driven off the market. As to price, he believed that competition would ensure that at any rate the cost in relation to nutritive value would not be increased.

The only food standards at present enforced by legislation are for:

(1) Butter, which must not contain more than 16 per cent. of water;

(2) milk-blended butter, which must not contain more than 24 per cent. of water;

(3) margarine, which must not contain more than 16 per cent. of water and not more than 10 per cent. of butter-fat;

(4) milk, which must neither contain less than 3 per cent. of fat nor 8·5 per cent. of milk solids other than fat;

(5) skimmed and separated milk, which must not contain less than 8·7 per cent. of milk solids other than fat;

(6) condensed and dried milk, which are dealt with in detail by the Condensed Milk and Dried Milk Regulations;

(7) whisky, brandy, rum, and gin, which must not be diluted below 35° under proof;

(8) sulphur dioxide or benzoic acid as preservatives in certain articles of food.

In addition, certain standards have been recommended in Local Government Board reports, such as a minimum of 4 per cent. of acetic acid in vinegar, a maximum of 10 per cent. of calcium sulphate in acid calcium phosphate baking powders, a maximum of two grains of tin per pound in canned foods, and of one-hundredth of a grain of arsenic per pound in any food.

The Ministry of Health have recently, in conference with the port medical officers, fixed temporarily the maximum amount of lead and copper which may be permitted in certain imported foods.

Up to the present time, therefore, very little has been done by way of fixing standards, or even definitions, for foods, and, in consequence, local authorities, public analysts, and food and drugs inspectors are frequently in doubt as to what should be considered genuine and what adulterated. If legal action is taken in regard to a food for which there is no prescribed standard of quality or composition, the justice must himself fix a standard upon the evidence before him, or at least decide upon a minimum below which the food may not fall. It is obvious that the justice may well give the benefit of any doubt to the defendant. Moreover, his decision may be influenced by the degree of skill with which the evidence for the prosecution and the defence, respectively, is presented, and this leads to different decisions in different courts in similar cases. For these reasons, local authorities have frequently refused to take legal proceedings. No doubt, even in the absence of standards, gross and definitely harmful adulteration is usually dealt with, but minor degrees are not, with the result that practices which are, to say the least, undesirable become "customary in the trade".

Jam Standards

Dealing with jam, among other articles, he recalled the Sale of Food Order, 1921, since revoked, which did fix certain standards. Under the order the water-soluble extract of jam had to be not less than 65 per cent., and not more than 10 per cent. by weight of jam might consist of added fruit. The present position is difficult for the food manufacturers, who do not know where they are or when they are safe, and the best of them are no doubt subjected to unfair competition. Dr. White called attention to the jam standards issued in 1930 by the Jam Panel of the Food Manufacturers Federation, in conjunction with the Society of Public Analysts and other analytical chemists. He did not agree that the standards were satisfactory or that the description on the labels was fair to the consumer. In "first quality" jams the minimum fruit content varies with the nature of the fruit, from 42 per cent. in strawberry jam and 38 per cent. in raspberry, down to 30 per cent. in black currant, and no declaration of added fruit juice and/or pectin is required. In "second quality" jams the minimum fruit content is in all cases 20 per cent. and the words "with

other fruit juice" must appear on the label. Dr. White considered that these standards were far too low. He also suggested that it should also be clear that first quality jam should be made from fresh fruit and not from imported fruit pulp preserved with sulphur dioxide. Moreover, he submitted that the label "Full Fruit Standard" is liable to mislead the purchaser, and concluded that it would be better to return to the practice of making our jam and marmalade at home.

During the subsequent discussion, Mr. Hinks, Public Analyst, pointed out that the National Mark select grade of jams put the standard of fruit content at less than 50 per cent. Generally, in regard to standards, the trouble had been to enforce them. The variability of the composition of fruit itself constituted a difficulty, and there were also other difficulties with regard to analytical technique. He also pointed out that a commercial jam had to stand up to severer conditions, such as transport, etc., than home-made jam, and to do this its composition must be adjusted accordingly.

Fat in Cream

Continuing his paper, Dr. White pointed out that there is no standard on the fat content of cream. In connection with canned cream there have been some cases of cans being labelled "very rich cream guaranteed to contain 25 per cent. butter-fat". To those who know what the fat content of cream may be the two statements in this label contradict themselves, but the ordinary housewife does not know, and is deliberately deceived into thinking that she is purchasing a specially good and nutritious article, whereas actually she is buying half-cream.

Cheese Grading

Turning to cheese, there is no standard of fat content, and in fact it varies from 10 per cent. or less to 60 per cent. or more. In 1930 a Bill which failed to become law was introduced in Parliament. This Bill defined three classes of cheese, covering "whole milk cheese", cream cheese, and skimmed milk, etc. It is not quite clear why this Bill was unacceptable to Parliament, but in view of the fact that cheese can be both a highly nutritious and a cheap article of diet, it is very desirable that it should be the subject of regulations as to its composition and description.

There are a number of other foods, the composition or description of which might well be the subject of legislation—for example, sausages, potted meat, pastes, beef extracts, shredded suet, custard powders, baking powder, infant and invalid foods, etc.

An Advisory Committee?

It is interesting to note that in the Report of the Committee on the Composition and Description of Foods it is stated that the Society of Public Analysts suggested "that a statutory advisory committee should be formed by the Minister of Health, consisting of representatives of the Ministry, public analysts, manufacturers and consumers, to consider all matters relating to the Food and Drugs Acts and all work coming within the purview of the public analyst, and to make recommendations to the Minister on food standards, definitions, labelling and description of foods, processes of analysis and similar questions".

Dr. White thought that despite the fact that the departmental committee did not recommend the constitution of such a new permanent body and were of opinion that whatever was necessary could be done by the Food Department of the Ministry of Health after hearing in each case the views of the various interests concerned, he was not sure that this procedure is the best or quickest way of dealing with the many difficulties, and that there is much to be said for a permanent Advisory Committee, in which not only public analysts but medical officers of health and food and drugs inspectors should be represented.

Mr. Bonham's Paper

Another paper was read by Mr. A. E. Bonham, Chief Sanitary Inspector, Exeter. Mr. Bonham was also interested in Section 6 (2), and suggested that it might be interesting to compare some food trade advertisements with what is actually sold, and, of course, with a public analyst's certificate. He made special mention of the sausage, which is still—save with regard to unsoundness and the addition of preservative—unregulated as to meat content. As a rule all are advertised as "the best", although prices range from 6d. to 1s. 6d. per lb., and he submitted that the new Act might at least have provided that uncooked sausages should contain not less than 50 per cent. of meat, of which not less than half should be lean, or perhaps that 30 per cent. of the meat should be lean meat.

He proposed this in the form of a resolution to the meeting, and also that the composition of ice-cream be regulated as to its milk-fat content, but these resolutions were not carried, a large majority of those present voting against them. Mr. Hinks pointed out that as lean meat also contained a certain amount of fat it would be better to put down a maximum of actual fat-content, and that there should be different standards for pork and beef sausages.

Margarine

With regard to margarine, an important extension of the present law requires that a label or advertisement which states that margarine contains butter must now also state the percentage of butter in the mixture, an error of 2 per cent. being allowed, but the amount of butter-fat therein may not exceed 10 per cent. This requirement will help the housewife, for she will now be able to decide whether the purchase of such mixtures is worth while.

Both speakers raised further points of interest in connection with the Act. During the ensuing discussion a number of medical officers of health, sanitary inspectors, analysts and others spoke, and both papers and discussion were a valuable contribution to the better understanding of the practical implications of the new Act given by those intimately connected with its application.

MODERN COLORIMETRY IN RELATION TO FOOD

H. W. RUDD, M.Sc., A.I.C.

THERE IS probably no single problem which enters so extensively into all branches of industry as that of colour. The human mind shows some curious manifestations and illustrates again and again the importance of colour in everyday life. People like to have their houses decorated inside and out in the particular colours which appeal to their æsthetic sense, their curtains and furnishings must conform to certain standards which they themselves have chosen, their clothes (especially those of women) must be of just the right shade, and even food is not exempt from the critical eye of the housewife. No modern manufacturer in any department of industrial activity dare ignore the sales value of colour, but at the same time he cannot close his eyes to the fact that this search for colour perfection has brought many attendant difficulties in its train.

Colour Variations

It is, of course, a commonplace that paints, wallpapers, dyed fabrics and other coloured commodities must conform to rigid specifications as regards colour. It is equally important, however, that foodstuffs should be as carefully controlled and show no appreciable variation from standard. Mere colour variation as such may, of course, mean little or nothing, but to the consumer it invariably suggests some change in quality, which is at once resented. There is a popular craze for perfect whiteness in such widely different commodities as fabrics, paint, motor spirit and flour, and the public has just as definite ideas as to what it wants in all types of foodstuff, from cereals and sugar to fats, food extracts and beverages of all kinds. For these reasons the food manufacturer is required to know something at least about the application of colour to his industry and of the best methods of testing and standardisation.

For those unacquainted with the vagaries of colour there are many pitfalls to be avoided in the comparison and regulation of colour. To begin with, colour is not infrequently an unstable property, especially in substances of complex chemical structure such as foods, which are themselves liable to undergo change with age. Tests carried out over a period frequently show a deterioration of colour, often associated with incipient or actual decomposition. In some cases the development of colour may be the first sign that decomposition is taking place, and the detection of colour change then assumes a double importance. The food manufacturer, moreover, has a further difficulty in that the differences he may be called upon to detect are very small compared with those encountered in other industries. In short, his colour-measuring instruments must be very sensitive and of a high standard of accuracy, and the staff who have to test colours should be persons who are known to have a highly developed appreciation of colour values.

Subjectivity of Colour

Colour is a very elusive phenomenon, being, in fact, a sensation produced in the brain as the result of stimuli of the retina of the eye conveyed through the optic nerve. It is thus purely subjective, and apart from scientific instruments, which function independently of an observer, there can be no absolute standards of colour, for what appears one thing to one person may be quite different to another, a fact which is evidenced by the comparative commonness of colour-blindness and insensibility. These considerations make all the more urgent the necessity of some methods of standardising and testing colour.

The practical essentials for the proper control of colour are: (1) means of comparing samples with accepted standards; (2) means of expressing colour in terms of some convenient units for purposes of record, in order to eliminate the necessity of relying on colour patterns, which may change with age, and to provide means for describing a colour without actual samples; and (3) the elimination of the personal element in colour-matching. Unfortunately, the last aim is difficult to achieve, as instruments which are not dependent on the skill and idiosyncrasies of the observer are invariably rather costly. Simple visual comparison of samples is, indeed, often sufficient for all practical purposes, and, since it is the ultimate test applied by the consumer, the method has much to recommend it. Unfortunately, standard colours are not always to be relied upon to keep correct over a long period, and it is a common experience for a matcher to discover that all his work is going astray because the standards he has been using have faded completely from what they originally were. The use of colour comparing and measuring devices, broadly termed colorimeters, is therefore an essential, and their introduction has put the whole subject on a scientific basis.

"Additive" and "Subtractive" Methods

Two principles are in common use in modern colorimeters: (1) that of passing light from a standard source through controllable colour filters so that an emergent beam is obtained corresponding in colour to the sample under test (this is called the "subtractive" method, and is in effect an analysis of light); (2) the "additive" method of combining coloured beams (usually of three primary colours) in such proportions as to produce a colour corresponding to the sample under test, a procedure which is in effect a synthesis of light. There is also a third method now becoming available, depending on analysing spectrographically the light emitted by a substance on illumination with white light and comparing the intensities of the light at different parts of the spectrum produced by means of curves.

The subtractive method depends on the principle that ordinary white light is composed of light of various wavelengths (that is, the ordinary spectrum colours), any one of which may be removed by passing through suitable filters of coloured glass. By a proper selection of standard filters a final beam can be produced of any required colour, which is then compared with the light obtained from the sample to be examined when illuminated. Of the instruments operating on this principle, probably the best known is the Lovibond Tintometer. In this the light source is an ordinary electric lamp run off the mains, with special filters to produce a close approximation to natural daylight; a ray of light so produced is reflected from a pure white screen of magnesium carbonate and passed through a series of colour filters of yellow, red and blue, which are so arranged by the operator as to produce an image in the eyepiece of similar appearance to that produced by the sample itself. For very bright colours a special dark slide is used, which dulls the colour down slightly. The colour filters are numbered according to their relative strengths, enabling the final colour to be read off in terms of units of red, blue and yellow. The instrument, which is available for the examination of liquids as well as solids, has the advantages of being simple and rapid in operation, accurate and comparatively inexpensive. Among its more general applications may be mentioned a few special uses, including the estimation of carotene in dairy produce and the antimony trichloride test of vitamin A. The Lovibond is also available in various special modifications suitable for the brewing industry, wines and spirits, the manufacture of caramel, sugar, vegetable oils and fats, etc.

Use of Colour Filters

A somewhat newer instrument, which by means of special colour filters utilises certain wave-lengths of light and compares their absorption, is the Bolton and Williams Photo-electric Colorimeter. Colour is expressed in terms of the percentages of light of various narrow wave-bands absorbed by a column of liquid of definite length.

The light from the standard source, controlled in intensity by a shutter, is filtered through a 1 per cent. copper sulphate solution to remove infra-red rays, and then all but certain selected wave-lengths are cut off by passing through suitable Wratten filters. The standard liquid is interposed and the galvanometer (which is actuated by a photo-electric cell) adjusted to zero by manipulation of the shutter. On replacing the standard by the liquid to be tested, the galvanometer indicates immediately the percentage of light absorbed of whichever colour is being used. The operation may be repeated, if required, with other wave-lengths, and accurate colour comparisons free from personal error of the observer are assured. A modification of the instrument is available for opaque surfaces, and by one or other of these instruments pastes, powders and liquids of all kinds can be examined. Great sensitivity is claimed for the apparatus, and differences of colour are shown up which are not perceptible to the human eye.

Colorimeters functioning on the additive principle are somewhat more complicated in construction than the foregoing types, but they give results of a higher order of accuracy and are, of course, more expensive. Underlying them is the theory that it is possible to produce any desired colour by a suitable combination of three primaries, which may (as in most of these trichromatic colorimeters) be red, green and blue, although other combinations may be chosen. The theory may be expressed graphically by considering a triangle, in which the apices represent respectively 100 per cent. red, green and blue. Any colour composed exclusively of red and blue will then be represented by some point on the side of the triangle joining the red and blue apex, and all colours composed of blue and green will similarly be represented by the side joining the blue and green apex. Any colour composed of all three primaries will be represented by some point within the triangle. In actual practice, beams of the primary colours are produced, blended perfectly by means of appropriate optical devices and projected on to a screen, where they are compared side by side with the samples under test.

Trichromatic Colorimeters

The Guild Trichromatic Colorimeter is one example of this type that has been used with success for a number of years. The more recently introduced Hilger instrument is slightly more simple in construction, depending for the synthesis of the required colour on the rotation of a disc coloured sectionally in red, green and blue. Still another type is the Donaldson Trichromatic Colorimeter. Among the many uses of these colorimeters may be mentioned as of especial interest the detecting and measuring of colour changes in meat and fruit products during storage.

Another interesting instrument is the G.E.C. Photo-electric Colorimeter, which makes use of two matched photo-electric cells actuating a galvanometer. The liquid to be examined and the liquid standard are placed in similar glass containers and the colour of the unknown liquid compared with that of the standard is indicated by the galvanometer.

The Use of Standards

The preparation of suitable standards is a matter of some importance, though in some of the instruments enumerated above the use of standards is not essential. Solutions of certain coloured salts and fast soluble dyes can often be prepared, and these may be relied upon indefinitely to retain their colour unchanged. A rough-and-ready method of comparing the colours of liquids consists in filling a small specimen tube with the standard and comparing with a similar tube containing a similar quantity of the liquid under test.

A casual consideration of this question of colour testing may lead to the impression that it can only be solved by resort to complicated and elaborate apparatus. In actual practice, however, it is found that the simplest expedients, so long as they satisfy requirements, are the best means of dealing with the problem. The first essential is for the colour tester to have a full appreciation of the amount of control he need exercise over his products, to use the simplest methods possible consistent with accuracy, and to know that if he requires to be more particular and precise in his work he can make use of the modern instruments which scientific research has made available for him.

The Fading of Pigments

AT a meeting of the London Section of the Oil and Colour Chemists' Association on Thursday, April 20, Dr. J. O. Cutter, Chairman of the Section, presiding, Mr. K. Mackenzie-Richards discussed some of the work he had done in searching for practical and comparative methods of testing the fading of the newer organic pigments.

The lecturer stated that tests on coloured pigments exposed in artificial sunlight apparatus such as the Fugitometer showed very different comparative results in only a few cases; usually the Fugitometer or arc lamp gave the same comparative fading as sunlight. It was never safe to assume, however, that a test of any new pigment or new mixture of pigments in artificial light would give a true picture of what would happen out of doors. He had found that with the best lamps one hour's exposure was not quite equal to one hour of June midday sunshine, but, of course, one could get 24 hours of fading per day with the lamp. Small differences in fastness to light appeared to show up more in a daylight exposure, and one was apt to be misled into thinking that one arc lamp was practically as good as another by a lamp exposure when only a very slight difference in fading occurred; but when exposed outside an unexpected difference occurred.

In conclusion Mr. K. Mackenzie-Richards stated that the greatest difficulty about fading tests was the determination of the amount of fading which had occurred and the comparison between the standard and the exposed sample. Possibly better results could be obtained by using an instrument like the Guild colorimeter to measure the loss of brightness and change of shade on exposure, but one would still depend upon the human eye for comparison. A scientific method of determining the amount of fading, however, would be of immense advantage to the colour trade, and he hoped that someone would be able to devise an accurate method.

The Resazurin Test for Milk

(*Continued from page* 198)

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Correspondence

Employee's Rights

The Editor.

DEAR SIR,

With regard to your article on page 121 of the April issue of FOOD MANUFACTURE, "Employee's Rights to Wages during Illness", we should like some more information with regard to the position of workmen's compensation.

The way we read the last paragraph of this article is that "Barrister-at-Law" is of the opinion that a workman away due to an accident is entitled to full wages, but that the employer is entitled to deduct whatever compensation is paid by the insurance company. Surely this is definitely in contradiction of the Workmen's Compensation Act, and we should like to know of the cases the courts have held to establish this opinion, as although from a common-sense point of view, if a workman is entitled to full wages whilst he is away ill, he should be entitled to receive full pay for an accident caused through no fault of his own; but this is not the law of the land as we understand it, and if you can give us any further information we should appreciate it very much indeed.

Your comments would oblige.

Yours faithfully,
(*For* MUNTONA, LTD.)
M. BAKER-MUNTON,
Managing Director.

"Barrister-at-Law" replies as follows:

The point which has been raised by your correspondent is one of no little interest. The question, shortly put, is whether an employee who suffers an accident and claims and receives workmen's compensation is thereby precluded from recovering any wages at all.

Provided that the disablement is temporary and not permanent, this much is quite clear—viz., that the contract of employment notwithstanding continues unless it is determined by a proper notice, and *prima facie* one would say that according to the general trend of the authorities, while the contract of employment subsists, the right to be paid wages continues.

Now there is one case, Elliott *v.* Liggens, (1902) 2 K.B. 84, where it was definitely and expressly held that a workman who was incapacitated and whose employment was not terminated was not entitled to recover any wages at all while he was in receipt of workmen's compensation. Workmen's compensation, it was said, was in lieu of wages, and therefore the receipt of compensation excluded any right to receive any wages at all *as well.*

It is most difficult to reconcile this decision with the authorities, and particularly with the latest authority of Morrison *v.* Bell. Indeed, the correctness of the principle of Elliott *v.* Liggens was disapproved of by the Court of Appeal in Warburton *v.* Co-operative Wholesale Society, Ltd., 1917, 1 K.B. 663. In that case it was determined by the Court of Appeal that absence from work occasioned by an accident in respect of which workmen's compensation was being received by the workman did not itself terminate the contract of employment. That was, however, the only point that the law had to determine there, but one of the judges, Lord Cozens-Hardy, made these pertinent observations with regard to Elliott *v.* Liggens:

"It was held," he said, "in the case of Elliott *v.* Liggens, that the service was not ended, although the man could not, while in receipt of compensation, receive wages, and *apparently* not even wages less the compensation. *I feel some difficulty in understanding the ground upon which the latter point was decided, and I desire to keep an open mind if it should hereafter be necessary for this court to consider it.*"

Your contributor is of opinion that the decision in Elliott *v.* Liggens, which was thus strongly commented on, is erroneous, and that, applying the several principles decided by the cases, the employee is entitled in such a case to be paid by the employer the difference between the amount of his wages and the amount of the workmen's compensation he is receiving.

Wall's Ice-Cream

(*Continued from page* 194)

Paper cups or "tubs" are also used for packing ice-cream, and these are filled and capped quite automatically by a specially designed machine.

Fruit Juice Ices

"Snofrutes" and "Snocremes" are very popular with the kiddies. The former consist of sweetened fruit juices frozen in moulds in the form of triangular sticks. Four flavours are made—Lemon, Orange, Lime and Raspberry. "Snocremes" are similar to "Snofrutes" but contain milk products in addition.

It has been already mentioned that in the early days ice and salt was used to refrigerate the tricycles. This method of refrigeration had very many drawbacks as, apart from the weight of the ice, the salt is messy and corrosive. The problem was solved by the use of solid carbon dioxide, "snow" as it is popularly called. Wall's put in the first solid carbon dioxide plant to be erected in this country and now produce many tons of this commodity every day. It is extremely cold, light in proportion to its refrigerating power and evaporates without leaving any residue—ideal characteristics from the point of view of portable refrigerators.

Space does not permit full details of the many other phases of ice-cream manufacture. The refrigerating plant, for instance, would require an article to itself. Vanilla flavouring is used in large quantities, and this is manufactured in the factory from the vanilla bean. The laboratory also deserves some mention, as it is here that the bacteriological and chemical control of the ice-cream in all stages of preparation is carried out. Many samples are examined every day to ensure that the absolute purity of the product is beyond doubt.

SOME SUPPLIERS TO THE ICE-CREAM FACTORY OF T. WALL AND SONS, LTD.

Can Washing Plant: *Dawson Bros., Ltd.*
Freezers: *Cherry Burrell, Ltd.*
Glass-Lined Vats: *Enamelled Metal Products, Ltd.*
Insulation Work: *Newalls Insulation Co.*
Pasteurisers: *Cherry Burrell, Ltd.*
Refrigeration: *Lightfoot Refrigeration Co., Ltd.*
Thermometers: *Bristol Instrument Co., Ltd.; British Rototherm Co., Ltd.; Short and Mason, Ltd.*
Tub-Filling and Capping Machines: *Mono Containers, Ltd.*
Ice-Cream Containers: *Mono Containers, Ltd.*
Wrapping Machines: *Paillard and Benoit (A.I.S.), Ltd.*

INDEX

To "Food Manufacture"

Copies of the comprehensive 8-page index to last year's issues are still available to subscribers, who should apply to:

The Publishers, *Food Manufacture*
17, Stratford Place, London, W.1

BACTERIOLOGY AND BREAD MAKING

Fundamental Principles of Bacteriology, *A. J. Salle, B.S., M.S., Ph.D. (First edition.) xiii+679 pp. 24s. net.*

A scientific book for students, written by a teaching expert, presents considerable difficulty to the reviewer without teaching experience. Obviously, an author-teacher experiments considerably with his raw material—that is to say, his students—and the final form of a book written for them will be that most suited to them, and not necessarily to another class of reader.

Dr. Salle explains that he has written this book for those who are beginning the study of bacteriology, and especially those who plan to specialise on the subject; in fact, he aims at producing bacteriologists. He also says that it is a textbook of fundamentals, and that the usual textbooks either are too elementary or do not contain sufficient fundamental material to give the beginning student a solid foundation on which to build for more specialised work on the subject. The book, therefore, is not one destined for the expert or practising bacteriologist. According to the author, it differs from practically all books on fundamental bacteriology, in that it is written as a combined textbook and laboratory manual, and the experimental portion is not added as an appendix, but is woven into the body of the text under the appropriate chapters. The author believes that bacteriology cannot be properly understood or appreciated unless studied in conjunction with experimental laboratory work, which is a truism; but at first sight the present reviewer disagreed emphatically with the idea of an intimate mixture of theory with practice in the way it is done here, remembering himself as a student of bacteriology using a purely practical manual as a bench book, while his theory was contained between the covers of another one. The time allotted for practical work was not so ample as to admit of any loitering on the way to delve into theory, and even in the matter of dimensions and weight there is some advantage in the separation of theory and practice. The earnest student, however, will no doubt learn to adapt himself to the finding of his way about the book.

Dr. Salle is nothing if not practical in the practical part. He gives a list of supplies which the student must furnish for himself; those found at his desk, and those furnished from the stores as needed. It is noted that the student at Dr. Salle's college is lucky enough to find on his desk a bacteriological microscope, complete with oil-immersion objectives, all to himself.

The laboratory rules are also practical. Instructions as to hanging hats, coats, etc., on hooks and not on laboratory desks; the hint not to leave valuables in coat pockets, to wash the hands with soap and water before leaving the laboratory, and to write in ink are some of the wise precepts given.

After two chapters on quite elementary subjects, one plunges into the consideration of growth phases in the nutrition of bacteria, and the reader is supposed to be acquainted with pH, chemical formulæ, and so on, although pH is explained in detail further on. But it is evident throughout the book that the student is supposed to be considerably versed in both organic and inorganic chemistry.

In the chapter on Biological Stains, their structural formulæ are given, and the organic chemistry here implies a fairly advanced knowledge. It is certainly quite a new idea to see the structural formula of carbolfuchsin given just before the instructions on staining with it.

Owing to the wide scope of the book, the different sections are treated fairly briefly, but with remarkable clarity, and nothing vital has been left out. In the chapter on the Morphology of Bacteria the main forms are shown diagrammatically, and instructions on intravital staining and the examination of metachromatic granules, capsules, flagella and spore staining are given, while staining by Gram is usefully detailed.

Incidentally, at the end of each section, and not tucked away at the end of the book or at the end of the chapter, are bibliographical references, and a set of questions which no doubt will prove very useful for examination purposes is given.

The molds and yeast are given useful chapters, which are well illustrated. Pure culture technique, disinfection and disinfectants are treated, and the respiration of bacteria, protein decomposition and industrial fermentations are clearly dealt with.

The latter half of the book treats on special applications for bacteriology, such as that of water, soil, air, milk and milk products, foods, etc.

On page 502 it looks as if the author wished to suggest that boric acid is added to various foods, and he actually says that it is sometimes added to butter as a preservative. He also says that salicylic acid and salicylates are used as preservatives for fruits and vegetables, but, although the reviewer has not a copy of the American Food and Drug Regulations handy, they are certainly not permitted in this country.

Further chapters deal with bacterial diseases of plants, bacterial dissociation, infection and immunity, and specific bacterial infections producing disease in man and animals.

Altogether an admirable book for the purpose for which it has been written, and the more it is examined, the less important seem the minor objections expressed in the first part of this review.

W. T.

Breadmaking: Its Principles and Practice, *Edmund B. Bennion, M.Sc.Tech.(Vict.), A.I.C. (Second edition.) xii+324 pp. 15s. net.*

The second edition of Mr. E. B. Bennion's book on Breadmaking comes ten years after the first. As in the milk industry, knowledge grows apace as the result of research. The author is specially qualified to put on record the progress which has taken place in the science and art of breadmaking, having himself done much useful work.

Mr. Bennion states that his book was written primarily for students to cover the syllabus of the City and Guilds of London Institute in breadmaking, and as head of the National Bakery School, Borough Polytechnic, London, he is in a favourable position to gauge the nature and scope of the information necessary to impart. The subject-matter is well arranged, and the whole field of bakery matters is brought under review.

The chapter on Raw Materials has been considerably extended, and chapters xii and xiii, dealing with the judging of qualities and faults in bread and the defects of flour, yeast and bread, have been extended so as to be a very practical guide on all troubles which beset the baker from time to time.

The book is essentially a practical one, although the necessary theory is not neglected. There is a completely new chapter on flour and dough-testing, and the particular apparatus used for this is described and illustrated. The different types of machinery and ovens are well covered.

The index is adequate (not always the case with technical works), but for the student the inclusion of a bibliography of current periodical literature might have been helpful.

W. T.

NEWS FROM THE INDUSTRY

—DEVELOPMENTS IN ESSENTIAL OILS AND FLAVOURS

New Flavouring Essences

The rapid growth and development of Messrs. Polak and Schwarz (England), Ltd., since the company was formed in July, 1926, is shown by their extensive new factory at 50, Great Cambridge Road, Enfield, Middlesex.

In their new headquarters they hope to continue producing flavouring essences and perfumery products, and to extend the manufacturing side of the English organisation.

The company recently held a reception at Enfield, when the Chairman, Mr. Adolf Schwarz, and Mr. Mansfield, a director of the company, met members of the Press. Mr. Adolf Schwarz received the visitors, and put on record, in what he termed diplomatic phraseology, the happy relations, political and economic, which existed between Holland and this country.

The firm manufactures a number of Strawberry Essences, all able to withstand criticism, but claim that their last creation, Dutch Strawberry Essence (non-alcoholic) is extraordinarily true to nature.

Some years ago, by virtue of continued research in their laboratories, Polak and Schwarz evolved "Gooseberry Essence M", and they have recently followed this up with "Frisian Plum Essence 87", which faithfully reproduces the delicious fresh flavour of this typical Dutch fruit.

* * *

Flavours for Powdered Foods

The "Drydex" series of flavourings manufactured by A. Boake, Roberts and Co., Ltd., of Carpenters Road, Stratford, E., are non-volatile, whereby no loss is incurred through evaporation during the processing or in storing of goods in which "Drydex" is used. They are protected and do not deteriorate either through contact with acids or alkalis in the mix, or by oxidation. Being dry, free-running powders they are easily mixed in any kind of foodstuffs.

A handy booklet on the use of Drydex Flavours, and their application in foodstuffs, together with some helpful recipes, can be obtained on request.

* * *

New Confectionery Flavours

W. J. Bush and Co., Ltd., have introduced, during the past few months, a number of new confectionery flavours, most notable of which are Essence Rhubarb No. 1, Essence California Pear C. 7325, Essence Fruit Salad No. 1, Essence Vanilla Superb; each of these is suitable for boiled sweets, fondants, jellies and chocolate centres, the Essence Rhubard being particularly satisfactory for flavouring rhubarb rock, which is a popular sweetmeat in Scotland.

The following additions to W. J. Bush's now well-known "Eesi-Flo" Fruit Concentrates have been made: "Eesi-Flo" Apricot,, Greengage and Peach. Four flavours have been added to the firm's Fruit Concentrates "95" series—namely, Apricot, Red Currant, Grenadine and Loganberry.

* * *

Turpeneless Oil of Lemon

A firm which aims to produce a new outstanding product at least four times a year is T. Harrison and Co., of Burnley House, Willesden, N.W. 10.

During March last they placed on the market a new Turpeneless Oil of Lemon, which is very soluble and the quality was only produced by distilling the finest Hand-Pressed Oil of Lemon (Mezzagno brand)—a product which is imported and resold to the extent of several tons per annum.

In May last year T. Harrison and Co. introduced *Van-B-Ness* to the trade. This is not an essence, but a raw material containing all parts of the Vanilla Bean in synthetic form. It is soluble in water and therefore simple to use, and is claimed to save alcoholic costs as compared with Vanillin.

Forthcoming products are to be Fortified Natural Concentrated Raspberry and Strawberry juices.

This firm has had twenty years successful trading, and claim to have secured a name for high-quality products by reason of rigid analytical control.

* * *

Essential Oils for Wines

The grinding and distillation of English Clary Sage Oil for its essential oil, is being carried out in this country by Stafford Allen and Sons, Ltd., Wharf Road, London, N. 1. It is claimed to be superior to foreign oils of the same nature. For use in developing the bouquet of wines like hock and sauterne, this oil should be most useful.

During the year that has passed a number of toffee and fudge flavours, which are a departure from the usual vanilla and butter flavour types, have been developed.

* * *

Forty Years' Activity

Mr. Max Hilbert, who offers raw materials and specialities for manufacturing concentrates, Biscuit and Cake Manufacturers, Chocolate, Preserve and Foodstuff Manufacturers, Manufacturing Confectioners, and Aerated Water Makers, specialises in Essential Oils, Soluble Essences, Concentrated Fruit Flavours, and also Foodstuff Colours.

Mr. Max Hilbert would appear to be a philosopher, and issues a number of striking circulars and postcards, some of which show that he also has a pretty wit. He favours the postal, telegraphic and telephone services, as against conventional methods of travellers' calls.

Mr. Hilbert's products are put up in attractively labelled bottles and tins. His address is Lanadron Works, London Road, Isleworth, Middlesex.

* * *

Mr. R. N. Wright, A.R.C.S., B.Sc.

Diabetic Association

At the annual meeting of the Diabetic Association held last week at the School of Hygiene and Tropical Medicine, Gower Street, London, W.C. 1, Mr. R. N. Wright, of Crosse and Blackwell, Ltd., was elected a Member of the Executive Council.

Lovibond-Schofield Colorimetry

In this section of our April issue we mentioned the improvements made in the apparatus supplied by Tintometer, Ltd., in connection with the Lovibond-Schofield system of colorimetry. A very comprehensive pamphlet, giving full information on the apparatus and method of working, has now been issued and can be obtained from the Colour Laboratory, Milford, Salisbury, England.

* * *

Spekker Absorptiometer

Adam Hilger, Ltd., of Camden Road, London, N.W. 1, are well known for, among other optical instruments, those for colorimetric use. Several improvements have been made in the Spekker Photoelectric Absorptiometer, with which the depth of colour solutions may be readily measured without reference to the colour vision of the observer. In connection with this instrument a new model with long tubes up to 200 mm. in length, for use with very pale solutions, has been introduced.

Another item is the Donaldson Trichromatic Colorimeter, which has already been described in a former issue. A recent modification of this is that it can now be fitted optionally with glass colour filters in place of the former gelatine ones.

One new instrument has recently been put on the market, known as the Photometric Colour Comparator, and although this cannot be used for the examination of solutions it will no doubt have several applications in the food industry.

* * *

Bottle Washing

A booklet which cannot fail to interest all manufacturers handling bottles has just been published by the Imperial Chemical Industries, Ltd. Of special value to the Bottling Stores manager is a comprehensive description of the general principles of bottle washing. Another feature is the simple and direct way in which some of the most recent and important large-scale laboratory results are summarised and interpreted.

The use of the well-known I.C.I. detergents, which are designed to cover completely the manifold requirements of bottle washing, is described.

* * *

British Aluminium Co.

The British Aluminium Co., Ltd., have opened a branch office and warehouse at Abbey Buildings, Middle Abbey Street, Dublin (Telephone No. Dublin 22966), under the management of Mr. D. E. Cottrell.

Analytical Control Unit

A Self-Contained Fats Moisture and Solids Test Unit has recently been put on the market by A. Gallenkamp and Co., Ltd., of Sun Street, Finsbury Square, E.C. 2. This has been designed for rapid and accurate determinations of the percentage of fats and total solids in food products by the modified Röse-Gottlieb method.

The complete unit is arranged so that one operator seated in the centre has all the necessary apparatus and reagents easily to hand, and can carry out the work with a minimum of fatigue and delay.

A full description of the essential features and details of the determination of fat, total solids and moisture in milk products and other foods will be found in the new textbook, *Fat, Total Solids and Moisture*, Determinations by the "Technico" Tester, by R. E. Mason, M.Sc.(Lond.), A.I.C., published at 7s. 6d. net.

A. Gallenkamp and Co., Ltd., offer to facilitate a demonstration of this apparatus by appointment so that interested analysts may study its working.

* * *

Fruit Juice Plant

Plant that can be arranged for any throughput, suitable for all types of juices, not necessarily clear, is offered by the Aluminium Plant and Vessel Co., Ltd., of Wandsworth, London, S.W.

The A.P.V. "Flash" Pasteuriser and Cooler, which allows for heating and cooling in the same machine, is a leading feature. The makers claim that the sterilisation of cans, and of the filling-room atmosphere, is unnecessary when using this plant.

Brush Turbo-Generators

Yet another order emphasising the increased popularity of Brush-Ljungstrom Turbo-Generators has now been received by this company for a 30,000 kW machine from the West Midlands Joint Electricity Authority for installation at their Wolverhampton Generating Station. The value of this order is approximately £110,000.

* * *

Reorganisation

The Improved Emulsification Co., Ltd., of Greenford, Middlesex, has become a subsidiary of the Brush Electrical Engineering Co., Ltd., and the entire manufacturing and selling organisation has been removed to Loughborough, Leicestershire.

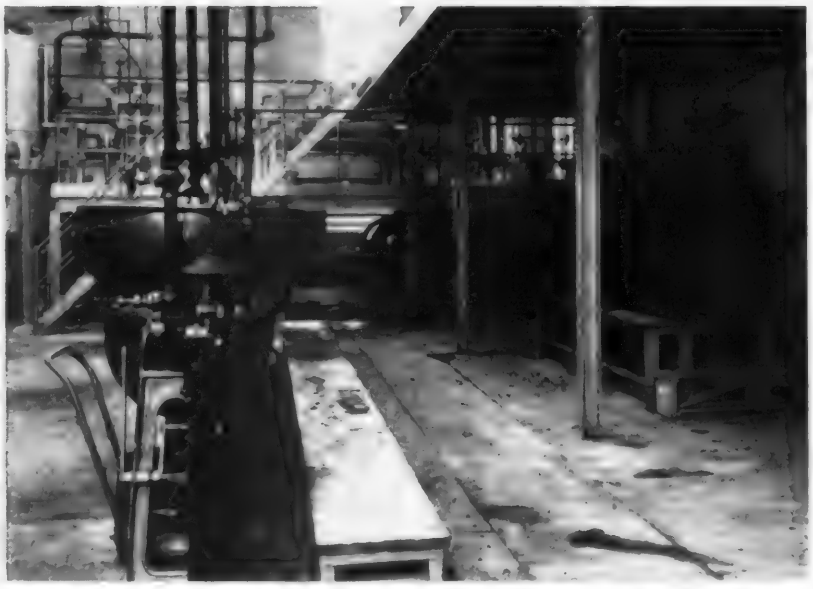
The company, which in the past has marketed the Impulsor Emulsifier, will also handle the "Brush" Homogeniser, and a wider range of emulsifying machinery is now available.

A Research Department and a specialised Technical Staff will deal with all problems in connection with the application of homogenisation of various products.

* * *

Errata

In an article on Modern Margarine Manufacture, published in the April issue of FOOD MANUFACTURE, p. 132, line 26, Palegaard should read *Pälsgaard*. In Fig. 3, p. 132, *dia-cooler* should be deleted. Fig. 4, p. 133, shows a complete Gerstenberg Margarine Plant.



Marmalade Machinery

William Brierley, Collier and Hartley, Ltd., whose London office is at Sentinel House, Southampton Row, London, W.C. 1, are well known as manufacturers of marmalade and jam machinery.

Our illustration is of a typical marmalade plant, of a type supplied to many leading firms in the trade. It shows a special rapid boiling pan in the foreground, the sugar dissolving and juice filtration plant in the background, and on the right-hand side may be seen the automatic feeding unit, from which the filtered sugar and syrup in measured quantities is blown, while still hot, direct to the boiling pans by compressed air.

Among the plant supplied to firms in the trade (including T. G. Tickler, Ltd., whose factory was described in the May, 1939, issue of FOOD MANUFACTURE) are chipping machines; patented machines for separating the white, shredding the red part of the peel and collecting the essential oil of orange from the latter; a stainless steel rotary brush for pulp, etc.

* * *

Five-Day Week

The twenty-first anniversary of the five-day week at Benn Brothers', Ltd., was celebrated by a lunch last month. It was the occasion of some short but brilliant speeches, notably by Sir Ernest Benn and Lord Snell. There were present members and friends of the firm and representatives of other companies who have adopted the five-day week. Among them were Messrs. C. G. Blaxter (Barnett and Foster, Ltd.), G. C. Clayton (Incandescent Heat Co., Ltd.), T. W. Coghlin (The British Commercial Gas Association), P. C. Drake (Price's Patent Candle Co., Ltd.), H. C. Edgell (Milton Proprietary, Ltd.), Arthur E. Ham (National Association of British and Irish Millers, Ltd.), Clifford Harrison (Horlicks, Ltd.), W. Leonard Hill (Leonard Hill, Ltd.), Frank Jones (South Metropolitan Gas Co.), J. Kemp-Welch (Peter Brotherhood, Ltd.), B. E. Kent (Allen and Hanburys, Ltd.), L. P. O'Brien (B. Laporte, Ltd.), J. W. Pearson (British Oil and Cake Mills, Ltd.), Renny Pinkney (Caird and Rayner, Ltd.), H. A. Price-Hughes (The British Thomson-Houston Co., Ltd.), F. E. Priestland (Cooper, McDougall and Robertson, Ltd.), A. E. L. Robey (Cakebread, Robey and C., Ltd.), C. J. Rose (Scott and Browne, Ltd.), Charles Shippam (C. Shippam, Ltd.), H. Cecil Taylor (Vauxhall Motors, Ltd.), R. J. Turner (C. C. Wakefield and Co., Ltd.), F. E. Waterman (Ransomes, Sims and Jefferies, Ltd.), and Commander Philip W. Kent (George Kent, Ltd.).

* * *

Transport Facilities

Some of the eastern districts of London and Birmingham have already received the first consignment of steel shelters. Those for London have come from South Wales, carried by the Great Western Railway. Some 350 wagons have been employed, a number to be increased subsequently to between six and seven hundred weekly.

Many hard things have been said about the transport services provided by our railway systems, but working in conjunction with each other, the Great Western Railway and London, Midland and Scottish Railway have just completed one of the largest and most important factory removals they have ever attempted.

A Yeovil firm has moved recently to Loughborough, 170 miles away, stipulating to the railways that there should be no reduction in output whilst the removal was taking place.

In co-operation with the officials of the firm, the G.W.R. drew up detailed schedules for the removal of every piece of machinery and the staff affected. One-half of the firm has maintained full production by day and night shifts, whilst the other part of the plant was dismantled, railed to Loughborough and erected in its new location ready for work. A staff of experts was employed by the G.W.R. to superintend the work of loading and packing, and over 5,000 tons of material was moved in three months.

The machinery moved varied from the 40-ton press to small and delicate instruments, and plant in operation at Yeovil one week has been dismantled, loaded, conveyed to Loughborough, re-erected and brought into operation the next week. Mobile cranes have been used to convey plant situated away from the private siding lines at Yeovil to the trucks and to take the container loads of small parts, castings and patterns direct to their position in the new works.

Taking this as an example of railway achievement and co-operation, it does not seem that the facilities offered can be easily superseded by other faster or more economical means of transport, and there should be no difficulty in the railways securing the "Square Deal" for which they now ask.

* * *

Stainless Steel

Sheffield's pre-eminence in the production of quality steels will be appropriately represented at the New York World's Fair by Firth-Vickers Stainless Steels, Ltd., Sheffield, in collaboration with the Brown-Firth Research Laboratories.

Their stand, situate in the "Hall of Metals" in the British Government Pavilion, epitomises in a striking and graphical way the history of Stainless Steel.

Its invention in Sheffield in 1913, to the thousand-and-one applications of the present day, is convincingly portrayed in photo-montage.

Among the range of exhibits which will be featured by Firth-Vickers Stainless Steels, Ltd., is a "Staybrite" Steel Tank (50 gallons capacity), a "Staybrite" Steel Sink Combination, a five-piece tea service of a very elegant design, tubes, valves, a canteen of cutlery, half-section dye-tank, a Rolls-Royce Phantom III. Radiator Body, and also a wide selection of "Staybrite" Steel utensils, illustrating its many applications in industry and in the home.

Rotary Self-Priming Pumps

Mono Pumps, Ltd., manufacturers of the Mono rotary self-priming pump, who are associated with John North (Founders and Engineers), Ltd., have recently completed the acquisition as a going concern of J. and E. Arnfield, Ltd., the old-established firm of general and textile engineers of Audenshaw, near Manchester.

The Arnfield Works, which cover an area of approximately 5 acres and comprise a newly constructed foundry, pattern shop, plate and sheet metal shop, light and heavy machine shop, and erecting and test shops, have been largely reorganised and re-equipped for the production and development of the Mono pumps and for the carrying out of general and textile engineering work on the most up-to-date and economic lines.

* * *

Magnetic Separators

In the May issue of FOOD MANUFACTURE we published an article on Magnetic Separators, and have now received some interesting details from Electromagnets, Ltd., of Erdington, Birmingham, on the different types of separators which they manufacture.

One of the outstanding points about the separators offered by this firm is that they can be easily de-magnetised. Included in the large range of equipment designed for different duties are the Chute Type of Magnetic Separators with Flux Control. With this equipment the energy within the magnets can be readily turned "On" and "Off" by a simple modification of the control lever. Another piece of equipment of the Drum type facilitates automatic extraction and discharge of the iron, which is essential on continuous plants or where the iron content is such as to cause a choke unless immediately disposed of.

A light, inexpensive magnet for determining whether a Magnetic Separator would be of commercial advantage, and also for experimental and laboratory work, is another interesting item, among many others.

* * *

Electro-plating with Tin

Electro-plating is a convenient way of coating other metals with tin, but uncertainty as to the best methods has deterred many from attempting this process and hindered its more general adoption. In order to overcome these objections the International Tin Research and Development Council has for some years carried on research upon electro-tinning, and as a result is now able to publish "Electro-tinning", Publication No. 92, a brief handbook of working instructions compiled by S. Baier. The book discusses in turn the advantages and drawbacks of each type of bath and should enable the most satisfactory type to be chosen for any specific purpose.

The working instructions as to how to make up, use, control and maintain the baths are given in full detail, with explanations of the theory underlying them.

Copies of the above publications may be obtained free of charge from the International Tin Research and Development Council, Fraser Road, Greenford, Middlesex, England.

* * *

Forcedraft Coolers

"Visco" Steelshell Forcedraft Cooling Units for small and medium water capacities and indoor as well as outdoor use, are the natural development of the well-known "Visco" Standard Fan Draught Coolers.

These small units are invaluable to the Refrigeration and Air Conditioning Engineer and the natural choice for Diesel Engines, Air Compressors, Water Cooled Transformers, Degreasing Plants and Electric Resistance Welders—in fact, wherever small or medium volumes of cold water are needed for heat extraction, it pays to install a "Visco" Forced Draught Cooling Unit in preference to other types and in preference to using town mains water and wasting it.

The Visco Engineering Co., Ltd., Stafford Road, Croydon, Surrey, issue a well-illustrated catalogue (No. 393) describing these coolers.

Chocolates for Diabetics

Messrs. James Keiller and Son—an associated company of Crosse and Blackwell, Ltd.—have perfected a new high-class plain chocolate made without the addition of sugar and therefore of special interest to those who must conform to a restricted diet.

The normal carbohydrate content of ordinary sweetened chocolate is of the order of 50 per cent., whereas the actual carbohydrate content of this new specially prepared chocolate is the low amount of only 2·6 per cent.—*i.e.*, 1 oz. of chocolate contains 0·74 gm. carbohydrate.

The issue of this product coincides with the launching of new non-glycerine conserves (marmalade and apricot jam) by the associated company Crosse and Blackwell, Ltd.

A useful additional booklet, giving important information for diabetic patients, following the previous one, has just been issued by Crosse and Blackwell, Ltd.

* * *

Filling Machines

The Alite Patent Machine Co., Ltd., of Holloway Road, London, N., have a new Improved-Type Alite Loose Filling Machine with a patent clutch control which gives precisely measured "fills" for every kind of pack. It will fill exact specific quantities from 100 mm. to approximately 1 lb.

The firm makes other interesting machines, one of which is a combined one which blends, sifts and mixes as a continuous process. Another item is the Alite Compression Filler for pastes, powders, mincemeat, etc.

* * *

Bag Filling

A series of leaflets showing a large range of filling and cartoning machines has just been received from Filling Machines, Ltd., of North Hillington, Glasgow, S.W. 2.

The range is very comprehensive and includes a Flat Bag Cartoning Machine, a Bench Type Powder Filling Machine, Automatic Glueing and Sealing Machine for Corrugated and Solid Fibre Packing Cases, Automatic Flat Bag Filling and Sealing Machine, and many others.

This firm also makes a grinding machine for Dry Powders, Spices, Grain, Colours, etc.

* * *

Telephone No. Changed

We are advised by National Adhesives, Ltd., that their telephone number at Slough has been changed to Slough 23344.

FOOD DEFENCE PLANS

Potatoes in Wartime

The Food (Defence Plans) Department announce that comprehensive arrangements have been made through the organisation of the Potato Marketing Board under the direction of Captain John Mollett for the distribution of potatoes throughout Great Britain in the event of emergency.

The plans provide for the saleable crop of potatoes to be taken over by the Government. Fixed prices at the farm, fixed margins to merchants for services in connection with wholesale collection and distribution, and maximum retail prices chargeable to consumers would be established. In the fixing of prices due regard would be paid to the necessity of ensuring a fair price to the producer to enable him to maintain his production, and fair margins to the distributor to ensure efficient distribution and economic prices to the consumer. The rationing of supplies to the public is not contemplated.

In order to control the flow of supplies of potatoes from area to area, to ensure even distribution throughout the country and meet emergency conditions, the country has been divided into ten divisions, which have been subdivided into twenty-nine areas. Each area would be in charge of an Area Supervisor of the Potato Marketing Board assisted by an Area Committee of Potato Merchants. The Area Committees would, under directions from the Department, make local arrangements for the allocation of the purchases and supplies of potatoes within their areas and the diversion of supplies to other areas.

Potato merchants in wartime would, as agents of the Department, act as collectors from farms and as distributors from town depôts to shops, etc. The list of Authorised Merchants of the Potato Marketing Board would form the basis of this agency, but others who may not at present require authorisation would be added in wartime to the list of distributors. Merchants now dealing substantially in new or maincrop potatoes who do not require authorisation under the Potato Marketing Scheme owing to their purchases being made through Authorised Merchants or being confined to new potatoes, should make enquiry to the Potato Section, Food (Defence Plans) Department, Africa House, Kingsway, London, W.C. 2, if they desire their qualifications to be considered for wholesale agency in the event of war. As far as possible arrangements would be made to facilitate the functioning of merchants within the same areas and in the same type of trade as in peacetime.

In order to conserve petrol supplies, and in view of the bulky nature of potatoes, they would generally be conveyed by rail. Official depôts have been earmarked throughout the country, mainly at railheads, and potatoes would be available only at these depôts for distribution. Merchants would be informed of the depôts available to them.

Merchants would be allocated to an area in which they would be authorised as collectors of supplies from farms or as distributors of supplies from depôts.

Potato sacks would be taken over by the Department and arrangements have been made for their assembly, purchase and distribution.

* * *

Food (Defence Plans) Department Control of Meat and Livestock

In connection with their arrangements for maintaining food supplies in the event of war, the Department has recently appointed seven Area Meat and Livestock Officers in Great Britain, who will, in the event of war, act as deputies in their areas of Sir Francis Boys, K.B.E., the Director of Meat and Livestock.

North-Eastern: Sir Leonard J. Coates.
Midland: Lt.-Col. G. Blewitt, D.S.O., M.C.
South-Eastern: Sir Nigel Campbell.
South-Western: Major C. Potter.
North-Western: J. C. Kidd, Esq., F.A.I.
South Scotland: Alexander Murdoch, Esq., C.A.
North Scotland: N. M. Paterson, Esq.

These officers would act, in the event of war, as deputies in their areas of Sir Francis Boys, K.B.E., the Director of Meat and Livestock, and would be the principal local officers responsible for the general supervision of the control operations. They would be assisted by Area Officers for Livestock, Slaughterhouses, Wholesale and Retail Distribution and Transport.

Their functions in time of peace are to supervise generally the setting up of the skeleton control organisation in their respective areas.

* * *

Control of Oils and Fats

Mr. Jasper W. Knight has been appointed by the Department as Director of Imported Oils, Fats and Oil seeds, under the Department's plan for the control of oils and fats in time of war.

* * *

Other Commodities

There have been formed, in connection with the Food (Defence Plans) Department, the following committees:

The Yeast Distribution (Defence) Committee.

The Meat Importers Nations (Defence) Committee.

Mr. J. P. Van den Bergh has been appointed as Director of Margarine in the event of war.

* * *

Bakery Allied Traders' Association

Over sixty delegates were present at a meeting of the Bakery Allied Traders' Association which was held on April 19 last. Mr. Andrew Frame, the Vice-President, who was in the chair, expressed the keen desire of everyone to learn something of what was being done to safeguard the interests of the trade and the public in time of crisis.

The Council of the Association had set up an Emergency Committee, the chairman of which was Mr. J. Valentine Backes, who had prepared a very comprehensive plan.

Mr. Backes laid the plan before the meeting and this was discussed, and although details are not for publication, the main idea is the subdivision of the country into definite areas, the needs of which would be looked after by sub-committees, set up in each area in contact with the Food (Defence Plan) Department, through the central committee in London.

The plan was passed unanimously.

OBITUARY

Mr. Herbert Croft

A number of our readers will learn with regret of the death of Mr. Herbert Croft, who had spent practically the whole of his working life in the service of Crofts (Engineers), Ltd., of Thornbury, Bradford.

For the past 16 to 18 years Mr. Herbert Croft had been acting as manager of the firm's London office, and although he died at the age of 75 Mr. Croft retained his interest in the firm up to the end. He had previously travelled throughout England and Wales on behalf of the company.

Outside business Mr. Croft's hobby was dog breeding; he was a celebrated breeder of Airedale terriers, and exported to many parts of the world.

INFORMATION AND ADVICE

Linseed Powder for an Egg Substitute—Fruit Juices—Full Fruit Standard of Jam—Piping Jelly — Marmalade and Gherkins — Tomato Powder for Tomato Sauce — Information Supplied—Pressing Vanilla Beans—Information Required

Linseed Powder for an Egg Substitute

4,641. *In our February issue an enquirer asked for some information on a grade of linseed powder or jelly or a similar linseed preparation which is employed in the manufacture of an egg-saving liquid to be used in cake production in the bakery trade.*

We have now received the following formula from a reader in South Australia:

3¼ lb. of whole linseed.
7 gal. of water.
1/9 oz. apricot yellow dye.
3 oz. 20 per cent. diacetyl (butter aroma).

Boil the linseed in the water, for fifteen minutes, and add the colour. Strain through cheese cloth, then add the diacetyl. The product resembles the white of egg, but does not wholly replace eggs in baking. For sponge use ⅔ egg and ⅓ substitute, and in the case of block cake half egg and half substitute.

Fruit Juices

5,112. *We are making an orange juice, and the results seem satisfactory, but we are living in a very hot and damp country (in the summer there is about 90 per cent. dampness in the air), so we should like to know if our way of preserving the juice is sufficient, and if we can use a preservative which contains 25 per cent. formic acid. Also if we can export our juices to England, and which is the preservative allowed. As well as the orange juice we are making juice the same way with tangerines and bitter lemons.* (Alexandria.)

We have carefully noted your remarks on methods of making fruit juices, and while it is very difficult for us, from the description you give, to say whether your methods are correct, if you say the results are satisfactory it would seem that they suit your purpose. Modern methods, of course, involve pasteurisation and other treatment of the juice, but the matter is so technical that it is not within the scope of this section.

As regards preservatives, you certainly cannot use formic acid, and the only preservatives that are permitted for this product are sulphur dioxide and benzoic acid.

Pulps would probably be packed with SO_2, and it should be possible to export the pulp and also the fruit-juice product to England, provided they conform to the necessary regulations.

Full Fruit Standard of Jam

5,166. *We would like to obtain the following information with regard to the United Kingdom jam and preserve regulations:* (1) *What is "full fruit standard" required in a jam or preserve manufactured for sale in the United Kingdom?* (2) *Is the addition of pectin to such a jam or preserve permitted?* (3) *Is the addition of certified food colour permitted?* (4) *Is the addition of any preservative permitted?* (5) *If permitted, must 2, 3 and 4 be declared upon the label?* (6) *What are the fruit standards for lower grade jams and preserves "not full fruit standard"?* (Toronto.)

(1) The minimum fruit content required in full fruit standard jam varies with the nature of the fruit, from 42 per cent. in strawberry jam, 38 per cent. in raspberry, and 30 per cent. in black currant.

(2) The addition of pectin to such a jam is permitted.

(3) The addition of harmless colouring matter to jam is usually considered quite legitimate.

(4) Sulphur dioxide is allowed to the extent of 40 p.p.m.

(5) No.

(6) In second quality jams the minimum fruit content is in all cases 20 per cent., and the words "with other fruit juice" must appear on the label.

In the 1934 January issue of FOOD MANUFACTURE we published a table comparing the Food Manufacturers Federation standards with the National Mark Standards for seventeen different jams, and while we regret the issue is now out of print, we could supply a photostat copy of the table at the cost of 2s.

Piping Jelly

5,191. *Would you be good enough to inform us the ingredients and how to make piping jelly (that will flow smoothly from a paper bag), made from agar or any other main body?* (Melbourne.)

We published an article on this subject in FOOD MANUFACTURE for May, 1931, by James Stewart, of the National Bakery School, which gave four formulæ. Should you not have a copy available, one could be obtained from this office, price 2s. 4d.

Marmalade and Gherkins

5,203. *We are in trouble* (1) *with sugaring coming on our marmalade (orange) when it has been made for some weeks, and* (2) *after having fermented gherkins and put them into pickle, we are troubled with a lot of soft gherkins.* (Norway.)

With reference to the first trouble you are experiencing, we give below an extract from an article on the Granulation of Marmalade, taken from FOOD MANUFACTURE, 1935, page 233:

"There is sucrose (or cane sugar) and dextrose (or

glucose) crystallisation. The prevention of both these types depends on the maintenance of the correct balance of sucrose and glucose in the jam. Of the 70 per cent. or so of soluble solids in the marmalade about 30 per cent. should be either glucose or invert sugar, and the remaining 40 per cent. should be sucrose. If these proportions are maintained approximately, granulation troubles may be eliminated. Crystallisation is more likely to occur in jams that are not well set than in those which are firm. Storage temperature is another important factor. A temperature of about 60° F. should be aimed at."

Regarding the fermentation of gherkins, we think you would find some valuable information in the 1939 *Food Industries Manual*, page 140, from which we quote as follows:

"The lacto-bacilli which cause this acid fermentation in the weak brine solutions are widely distributed in nature, and consist of a large number of species. They grow well in vegetable juices, more especially at a temperature of about 30° C. In northern cold countries the acid fermentation by these organisms is very slow. To prevent the spoilage of pickles, therefore, the following methods should be adopted:

1. Thorough cleanliness in the factory and all the utensils used.
2. Thorough washing of the vegetables.
3. Discard all rotting vegetables and cut away all decayed spots.
4. Do not use too weak a brine in the preliminary pickling process.
5. After the proper flavour and acidity are produced by fermentation in the weak brine, add salt up to 15 per cent. to kill all the harmful bacteria.
6. Finally, pickle in boiled vinegar which has a good acetic acid content.
7. Cover the pickles with a sufficient amount of vinegar, otherwise moulds may grow on the surface of the sold vegetable ingredients exposed to the air."

Tomato Powder for Tomato Sauce

5,249. *Can you provide us with a recipe for tomato sauce, using tomato powder?* (Bradford.)

In the May issue of FOOD MANUFACTURE we published a formula for tomato sauce using tomato purée, but we note that you wish to use tomato powder in place of the purée. Without making any comment on the relative quality of the sauce made from these two forms of tomato, we suggest that you ascertain the amount of dry substance in the purée available to you, and also that in the tomato powder, and by a simple calculation use a corresponding amount of tomato powder. Any analytical chemist would make the analysis for you, and also give you the relative quantity of tomato powder required to replace the purée.

Information Supplied

5,206. *Can you forward us, please, the address of firms making vegetable dicing machines?* (Glasgow.)

We supplied names of manufacturers.

Pressing Vanilla Beans

5,207. *We shall be glad to learn whether you can recommend a good manufacturer of hydraulic and hand fruit presses for the purpose of pressing vanilla beans.* (London.)

We presume the press is required for squeezing the vanilla beans after extraction with a solvent is completed. A wooden cider press is used for this purpose, and the name of a firm making such a press has already been sent.

4,993. *We shall be obliged if you will give us the name and address of a reliable manufacturer of machinery for biscuit making.* (Glasgow.)

The information was supplied.

4,998. *I want to start a small canning factory to pack ripe mango slices in cans, and shall be glad if you can give me particulars of any reliable canning machines which can turn out about a thousand cans per day.* (Kistna District.)

This information was supplied.

5,026. *Can you supply us with details of a small hand-operated machine for loading chutney, mayonnaise, etc., into 1-oz. glass jars and 6-oz. glass jars? We do not want a machine that will measure out any definite quantities. At the moment we have to load with a spoon.* (Madras.)

Names of suppliers of suitable implements were given.

5,027. *Can you give us the name and address of people who manufacture electrical stunners for pigs?*

These names were given.

5,092. *Please tell me of any implements for polony factories, which may be aluminium or any other metal. Fittings are also required.* (South Africa.)

The names of manufacturers were given.

4,926. *Could you assist me by giving me the names and addresses of manufacturers of puffing plants suitable for laboratory use?* (South Africa.)

These names were given.

5,179. *Names of manufacturers of orange, lemon and citron peel slicing machines.* (South Africa.)

Names of manufacturers were given.

5,264. *Information on pH testing.* (Melbourne.)

This was supplied.

5,190. *A good bleacher to use instead of blue.* (Liverpool.)

Information Required

5,273. *We are desirous of making a jelly to cut in dices and bake in a cake. We experience trouble in the baking—i.e., the gelatine runs and in using cornflour the jelly blows. Can you suggest a method and mixing or give us suggestions on the matter with reference to potato flour or any gums, etc.?* (Hants.)

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RECENT PATENTS

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

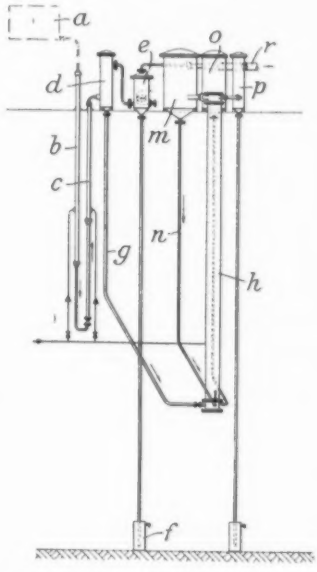
Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

Evaporators for Fruit Juices

Concentrating fruit juices.

In processes for concentrating fruit juices of the kind in which the volatile flavouring constituents are first distilled off, the residual liquor being then concentrated and the flavouring constituents finally returned to the concentrated juice, the concentration stage is carried out in evaporators of the climbing film type. Fruit juice is fed from a tank *a* through heaters *b*, *c* into a separator *d*, from which the volatile constituents are removed to a condenser *e*, the condensate being collected in a receiver *f*. The residual liquid is led through pipe *g* into a concentrator *h* of the climbing film type, the liquid and vapours being separated in a separator *m* and the liquid recycled through a pipe *n* to the evaporator *h* for further stages of concentration, the products being separated in receivers *o*, *p*. Vapours are drawn off from the separators through a common vacuum pipe *r*.



498,305. Reavell, J. A.

Latest Patent Applications

4455. Crowe, G. E. W., and Coleman, C. J.: Apparatus for cooking, etc., edible goods by fluid pressure. February 10.
8600, 8601. Plews, W. J.: Preparation of foodstuffs. March 17.
7433. Nederlandsche Gruyere Blokmelk Fabriek, N. V.: Production of solid milk products. March 7.
7405. Cogn, A. I.: Unbreakable vessel for jam, etc. March 7.
12490. Joy, H. A.: Egg preservation. April 26.
12412. Werkspoor, N. V.: Process, etc., for continuously crystallising sugar, etc. April 25.
12275. Mutual Citrus Products Co., Inc.: Method of controlling jelling properties of pectin, etc. April 24.
12143. Cleeff, L. van: Method of freezing fresh fruit, etc. April 22.
11891. Gruder, O. S.: Production of agents for the bakery, etc., trade, etc. April 20.
11598. Tanikawa, R.: Methods of refrigerating foodstuffs for preservation purposes. April 17.
11505. Rawlins, C. W.: Preservation of vegetables. April 15.
10901. Distillation Products, Inc.: Treating foodstuffs, etc., liable to develop rancidity. April 11.
10777. Nowland, R. L.: Process, etc., for making beverages. April 6.
10671. Flosdorf, E. W.: Apparatus for treating, etc., food products, etc. April 5.
10474. Stone, A. J.: Freezing process for foodstuffs, etc. April 4.
9884. Genova, A. F.: Apparatus for the instantaneous preparation of iced foodstuffs such as creams, etc. March 30.

Complete Specifications Accepted

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

499,996. Sivyer, L.W.: Apparatus for sampling bulk material such as sugar cane.
501,585. Hellinger, E.: Utilisation of whey and other dairy residual products.
8445. Huzenlaub, E. G., and Rogers, J. H.: Treatment of cereals. March 16.
8004. Blanch, W. M.: Food carriers. March 13.
504,098. Creamery Package Manufacturing Co.: Apparatus for heating or cooling a liquid in a tank, and particularly intended for the pasteurisation of milk.
504,092. Wilson, H. L., and Rogers, L. A.: Method of making and packaging Cheddar cheese.
504,006. Henkel, A. A.: Manufacture of highly porous sweets.
503,928. Dietz, J. P. M.: Meat-tendering apparatus.
503,662. Frova, G.: Fruit-pitting machines. (Cognate application 15665/38.)
503,607. Irmen, P.: Hardening of fats and oils.
503,491. Toledo Scale Manufacturing Co.: Storage of vegetable produce, including fruit.
503,421. Craemer, R. A.: Dispensing frozen foodstuffs.
503,297. May, F. E.: Egg substitute and process of making same.
503,121. Zimmerman, B.: Purifying beet-sugar juice.
503,053. Lehmann, F. B. (trading as Lehmann, J. M., firm of): Refining machines for cocoa-containing and like masses.

TRADE MARKS

(*Continued from page 218*)

SEA PRINCE.—601,168. **Canned fish.** British Merchants Incorporated, Ltd., 32, Lime Street, London, E.C. 3; and F. A. Gosse Co., Smith Tower Annex, 151, Yesler Road, Seattle, Washington. March 22.

It is a condition of registration that the mark shall be used only in relation to goods connected in the course of trade with both of the proprietors.

SILFLAKE.—605,163. **Condensed milk, butter, cheese and cream.** Standard Milk Co., Ltd., 46, Fish Street Hill, Eastcheap, London, E.C. 3. (Associated.) April 26.

SOLO.—604,979. **Flour.** Joseph Rank, Ltd., 107, Leadenhall Street, London, E.C. 3. (By Consent.) April 26.

SPIRE.—604,686. **Margarine, lard compound for food, edible oils and edible fats.** Western Margarine, Ltd., Alliance Factory, Western Avenue, Acton, London, W. 3. March 29.

TEXTOL.—604,707. **Edible oil emulsions and edible fat emulsions.** Textol, Ltd., Scottish Industrial Estates, North Hillington, Glasgow, S.W. 2. (By Consent.) April 19.

TICEL.—603,698. **Edible oils and edible fats.** Towers Creameries, Ltd., Towers Factory, Commonside East, Mitcham, Surrey. March 15.

TOF-KOL.—605,195. **Edible oils and edible fats.** Towers Creameries, Ltd., Towers Factory, Commonside East, Mitcham, Surrey. May 3.

603,967.—**Edible oils and fats.** Meadeking Robinson and Co., Ltd., Tower Building, Water Street, Liverpool. March 8.

This list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

TRADE MARKS

BAND WAGGON. — 605,055. **Confectionery and bread; and biscuits and cake (not for animals).** WESTON FOODS, LTD., 309, Thames House, Millbank, London, S.W. 1, and 504, Buckingham Avenue, Slough, Buckinghamshire. April 26.

BLACK MAGIC.—603,569. **Meat extracts, preserved, dried and cooked fruits and vegetables, jellies (for food), jams, fruit preserves and vegetable preserves, and pickles.** ROWNTREE AND CO., LTD., The Cocoa Works, Wigginton Road, York. (Associated.) May 3.

BREEFLAKE.—605,189. **Suet.** MERSEY CASINGS AND BY-PRODUCTS CO., LTD., West Bank, Widnes, Lancashire. April 19.

BREXCEL.—604,490. **Breakfast sausage.** EXCEL CO., LTD., 50 and 52, St. John Street, London, E.C. 1. (Associated.) April 19.

CARA-KOL.—605,193. **Edible oils and edible fats.** TOWERS CREAMERIES, LTD., Towers Factory, Commonside East, Mitcham, Surrey. May 3.

CENOK.—605,050. **Preserved fruit and preserved vegetables.** AKTIESELSKABET TONSBERG BRYGGERI, Notteroy-Veien No. 1, Tonsberg, Norway. May 3.

CHESTNUT TREE.—605,702. **Canned meats, canned fruits, canned fish and canned vegetables.** OXO, LTD., Thames House, Queen Street Place, London, E.C. 4. May 3.

CHO-KOL.—605,194. **Edible oils and edible fats.** TOWERS CREAMERIES, LTD., Towers Factory, Commonside East, Mitcham, Surrey. May 3.

CRESIMA.—605,026. **Preparations consisting principally of vegetable fat for use as a substitute for cream.** UNICREAM, LTD., 39, Dean Road, Manchester, 3. April 26.

DENNY'S.—604,095. **Bacon, hams and lard (for food).** HENRY DENNY AND SONS, LTD., Hibernia Chambers, London Bridge, London, S.E. 1. (Associated.) April 26.

Advertised before acceptance. Section 18 (1) (proviso).

EXPRESS DAIRY.—602,767. **Biscuits, tea, coffee, honey, sauces, tapioca and corn flakes (being prepared breakfast foods).** EXPRESS DAIRY CO., LTD., 15/17, Tavistock Place, London, W.C. 1. (Associated.) (By Consent.) March 15.

Registration of this trade mark shall give no right to the exclusive use of the word "Dairy".

FANCY DRESS.—604,551. **Sweetmeats.** USK VALE FOOD PRODUCTS, LTD., Ross Road, Abergavenny, Monmouthshire. March 29.

FARLEY'S.—601,610. **Rusks.** FARLEY'S INFANT FOOD, LTD., Torr Lane, Plymouth. (Associated.) March 22.

Advertised before acceptance. Section 18 (1) (proviso).

FASCINATION.—581,821. **Fresh, canned and dried fruits, canned vegetables, canned fish and canned meats.** GEORGE HERBERT ATKINS, DAVID ATKINS, CLIFTON HENRY KROLL and JOHN BRADBURNE MACKINLAY, trading as Atkins, Kroll and Co., 260, California Street, City of San Francisco, State of California, United States of America. (Associated.) April 26.

Fresh and dried fruits, canned meats and goods of the same description will be struck out from the goods of Registration No. 371,583 (1981) if and before the applicants' mark is registered.

FREEZERVED.—B 603,575. **Vegetables, fruit, meat and fish, all being goods which have been treated by a process of freezing.** BARON ERNSTBODO VON ZITZEWITZ, 3, Grosvenor Square, London, W. 1.

Proceeding under Section 29 (1) (a).

JEBAK.—603,727. **Flour, bread and pastry.** GERVAC, LTD., 57, West Orchard, Coventry. March 15.

KABIN.—B601,192. **Chocolates.** J. W. THORNTON, LTD., 1, London Road, Sheffield, 2. March 15.

KARDOMAH.—603,527. **Infants' and invalids' foods.** KARDOMAH, LTD., 42, Dale Street, Liverpool. April 12. (By Consent.)

MALGALAYA. — 605,180. **Preparations consisting principally of fat for use as filling or as piping in the confectionery and bakery trades.** MALGA (LONDON), LTD., Southall, Middlesex. (Associated.) April 26.

MID-DAY.—600,053. **Dried and cooked peas.** UNITED CANNERS, LTD., 40a. Norfolk Street, Boston, Lincolnshire. April 12.

User claimed from the year 1931. Section 12 (2).

NUX.—600,757. **Chocolate and confectionery.** ROWNTREE AND CO., LTD., The Cocoa Works, Wigginton Road, York. (By Consent.) March 22.

PACIFIC KING.—601,167. **Canned fish.** BRITISH MERCHANTS INCORPORATED, LTD., 32, Lime Street, London, E.C. 3; and F. A. GOSSE CO., Smith Tower Annex, 151, Yesler Road, Seattle, Washington. March 22.

It is a condition of registration that the mark shall be used only in relation to goods connected in the course of trade with both of the proprietors.

PANDA.—605,150. **Tinned meats and tinned milk.** S. D. SIMOND AND CO., LTD., Peninsular House, 28, Monument Street, London, E.C. 3. April 26.

POMTO.—605,129. **Non-alcoholic beverages and preparations for making the same.** J. N. NICHOLS AND CO., LTD., Britannic Works, Ayres Road, Brook's Bar, Manchester 16. April 12.

(Continued on page 217)

NEW COMPANIES

Checkland and Sons, Ltd. (352009.) April 18. 439, Bearwood Road, Smethwick, Staffs. Grocers and provision mchts. £5,000. Permt. dirs.: E. Checkland, H. J. Checkland.

Erimus Ice-Cream Company, Ltd. (351595.) April 5. 4, Palladium Buildings, Eastbourne Road, Middlesbrough. £5,000. Permt. dirs.: T. Thompson, W. B. Thompson, J. Bowen, R. M. Shields, W. S. Gibson.

A. H. Hurst and Sons, Ltd. (351630.) April 6. Mchts., agents and dlrs. in produce, preserved foodstuffs and canned goods, etc. £10,000. Dirs. not named.

H. Lawrance and Sons, Ltd. (352191.) April 22. Mnfrs. and distillers of and dlrs. in natural, mineral, aerated and other waters, etc. £5,000. Dirs. to be appointed by the subs.

One-Piece Pack Patents, Ltd. (352066.) April 19. To acquire from J. C. T. Daly a licence or other benefit of certain inventions relating to the mnfre. of cartons and other materials for packing eggs, etc. £1,500. Dirs.: J. C. T. Daly and A. W. Plastow.

Paramount Novelties, Ltd. (352023.) April 18. 28, Maddox Street, London, W. 1. Mnfrs., wholesale and retail dlrs. in and distributors of ice, ice-cream, sundaes, biscuits, etc. £1,000. Dirs. to be appointed by the subs.

Perratons, Ltd. (351312.) March 30. Fancy and other cake makers, refreshment room proprietors, etc. £7,000. Dirs.: H. Perraton, Bedford House, Tavistock; H. J. E. F. Perraton and Mrs. D. E. Perraton, Carn Brea, Tavistock.

Randle and Smith, Ltd. (351992.) April 17. To carry on the bus. of tinplate workers, chocolate and other mould designers and mnfrs. and metal stampers, and, if thought fit, to acquire the bus. of chocolate mould mnfrs. and metal stampers cd. on by Randle and Smith, of Rea Street South, Birmingham. £16,000. Dirs.: H. W. Smith, 81, Reddings Road, Moseley, Birmingham; Harriett Smith, address not stated; H. H. W. Smith, 67, Tenbury Road, Birmingham, 14.

Snellings Variety Stores, Ltd. (351780.) April 12. Grocers, provision mchts. and general retailers. £6,000. Permt. dirs.: S. Snelling, 404, Blackburn Road, Darwen; J. S. Snelling, 4, Lyndhurst Road, Darwen.

Sundox Products, Ltd. (351782.) April 12. Mnfrs. of beef and vegetable extracts. Team Valley Trading Estate, Newcastle-on-Tyne. £1,000. Dirs.: L. Roedelheimer, 26, Harley Terrace, Gosforth; G. G. Dunn, 19, Adeline Gardens, Newcastle-on-Tyne.

Super Cream Ices (Manchester), Ltd. (351883.) April 14. Ice-cream makers, etc. £5,100. Dirs. to be appointed by the subs.

Yorkshire Cielim (1939), Ltd. (351626.) April 5. Mnfrs. of and dlrs. in chocolates, pastilles, toffee, clear gums, etc. £1,000. Dirs. not named.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.